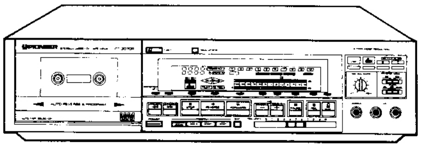
PIONEER®

Service Manual

CIRCUIT DESCRIPTIONS
REPAIR & ADJUSTMENTS



STEREO CASSETTE TAPE DECK

CT-3070R[BK]
CT-3070R

- Models CT-3070 [BK] and CT-3070R come in three versions destinguished as follows:

Type	Applicable model		Power requirement	Destination
	CT-3070R [BK]	CT-3070R		
HEM	○	○	AC220V (240V)*	European continent
HB	○	–	AC240V (220V)*	United Kingdom
D/G	○	–	AC120V/220V/240V (switchable)	U.S. Military

*Change the primary wiring of the power transformer.

- This service manual is applicable to the CT-3070R [BK]/HEM, HB, D/G and CT-3070R/HEM types.
- As to the HB and D/G types, please refer to pages 56 – 59.
- Ce manuel d'instruction se refère au mode de réglage, en français.
- Este manuel de servicio trata del método de ajuste escrito en español.

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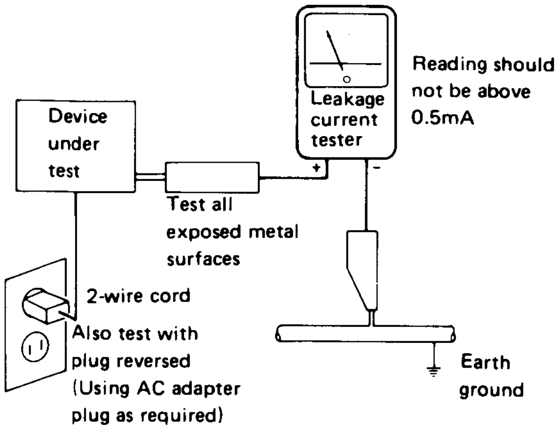
SAFETY INFORMATION

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.


Leakage current tester
Reading should not be above 0.5mA
Device under test
+
-
Test all exposed metal surfaces
2-wire cord
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

1. SPECIFICATIONS

System	4 track, 2-channel stereo
Heads	"Hard Permalloy" recording/playback head x 1 "Ferrite" erasing head x 1
Motor	DC servo motor x 1 DC reel motor x 1 DC assist motor x 1
Wow and Flutter	No more than 0.045% (WRMS) No more than ±0.09% (DIN)
Fast winding Time	Approximately 100 seconds (C-60 tape)
Frequency Response	
−20 dB recording:	
Nomal tape	25 to 17500 Hz
Chrome tape	25 to 17500 Hz
Metal tape	25 to 18500 Hz
0 dB recording:	
Chrome tape	25 to 10500 Hz
Metal tape	25 to 16000 Hz
Signal-to-Noise Ratio	
Dolby NR OFF	More than 58 dB
dbx ON	92 dB
Noise Reduction Effect	
Dolby NR B type ON	More than 10 dB (at 5 kHz)
Dolby NR C type ON	More than 19 dB (at 5 kHz)
Dynamic range (dbx ON)	110 dB
Harmonic Distortion	No more than 0.7% (0 dB)
Input (Sensitivity)	
LINE (INPUT)	54 mV (Input impedance 96 kΩ)
MIC	0.25 mV (Source impedance 600 Ω)
Output (Reference level)	
LINE (OUTPUT)	316 mV (Output impedance 3.2 kΩ)
Headphone	0.25 mW (Load impedance 8 Ω)

Subfunctions

- Recording/playback auto-reverse (Quick reverse)
- Random programmed playback
- Skip search/music search
- Noise reduction systems (dbx, Dolby NR B/C types)
- Auto tape selector
- Timer stand-by function
- Headphone jack
- Automatic rec mute function
- Large fluorescent tube
- 4 digit digital tape counter
- Multifunction switches (operation/music selection switch)
- System remote control available

Miscellaneous

Power Requirements	
HEM model	AC 220 V, 50/60 Hz
HB model	AC 240 V, 50/60 Hz
D/G model	AC 120V/220 V/240 V, 50/60 Hz (switchable)
Power Consumption	
KU, KC models	34 W
HEM, HB, HP models	40 W
D, D/G models	28 W
Dimensions (Except for D/G model)	420 (W) x 101 (H) x 318 (D) mm 16-9/16 (W) x 4 (H) x 12-8/16 (D) in
(D/G model)	458 (W) x 102 (H) x 318 (D) mm 18-1/16 (W) x 4 (H) x 12-8/16 (D) in
Weight [(without package) except for D/G model]	5.6 kg (12 lb 6 oz)
[(without package) D/G model]	6.4 kg (14 lb 2 oz)

Accessories

Operating instructions	1
Connection cord with pin plugs	2
Control cord	1

NOTE:
Specifications and design subject to possible modifications without notice due to improvements.

2. FRONT PANEL FACILITIES

TIMER switch

Used only when performing unattended recording or wake-up playback. Normally, leave in the OFF position.

COUNTER RESET button

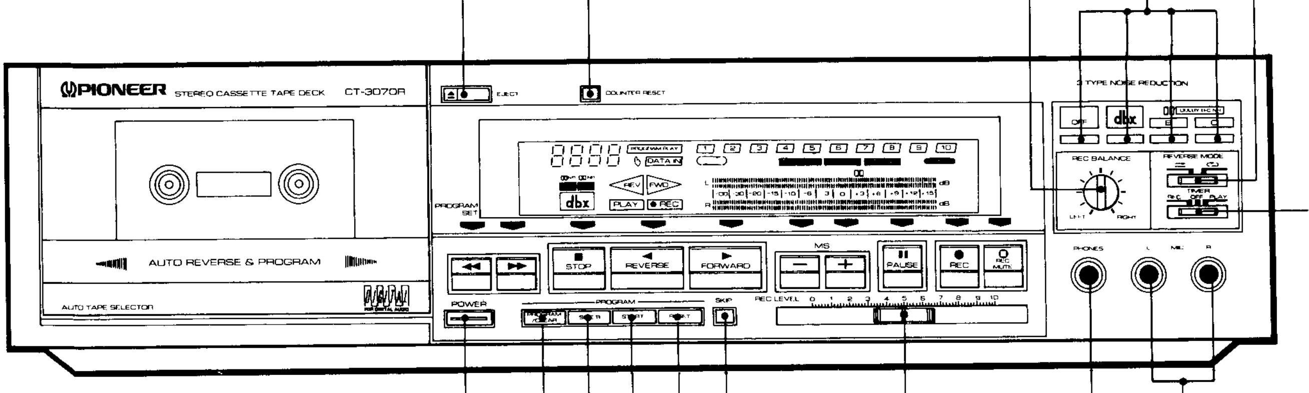
REVERSE MODE switch

EJECT button

If the power is disconnected while a tape is running, the eject function will not operate. In such a case, turn on the power once again, and then press the EJECT button.

Noise reduction switches

REC BALANCE control


PIONEER
STEREO CASSETTE TAPE DECK
CT-3070R
EJECT
COUNTER RESET
AUTO REVERSE & PROGRAM
AUTO TAPE SELECTOR
PROGRAM SET
dbx
PLAY
REC
STOP
REVERSE
FORWARD
MS
PAUSE
REC
REC MUTE
POWER
PROGRAM
SKIP
REC LEVEL
3 TYPE NOISE REDUCTION
OFF
dbx
REC BALANCE
LEFT
RIGHT
REVERSE MODE
TIMER
REC
OFF
PLAY
PHONES
L
MIC
R

MIC jacks

POWER switch

PHONES jack

PROGRAM/CLEAR switch

- Press to set unit to the random programmed playback mode.
- If a mistake is made during programming, press this switch to clear programmed selections and begin again.

REC LEVEL control

SKIP switch

Program RESET switch

Press to reset programmed playback.

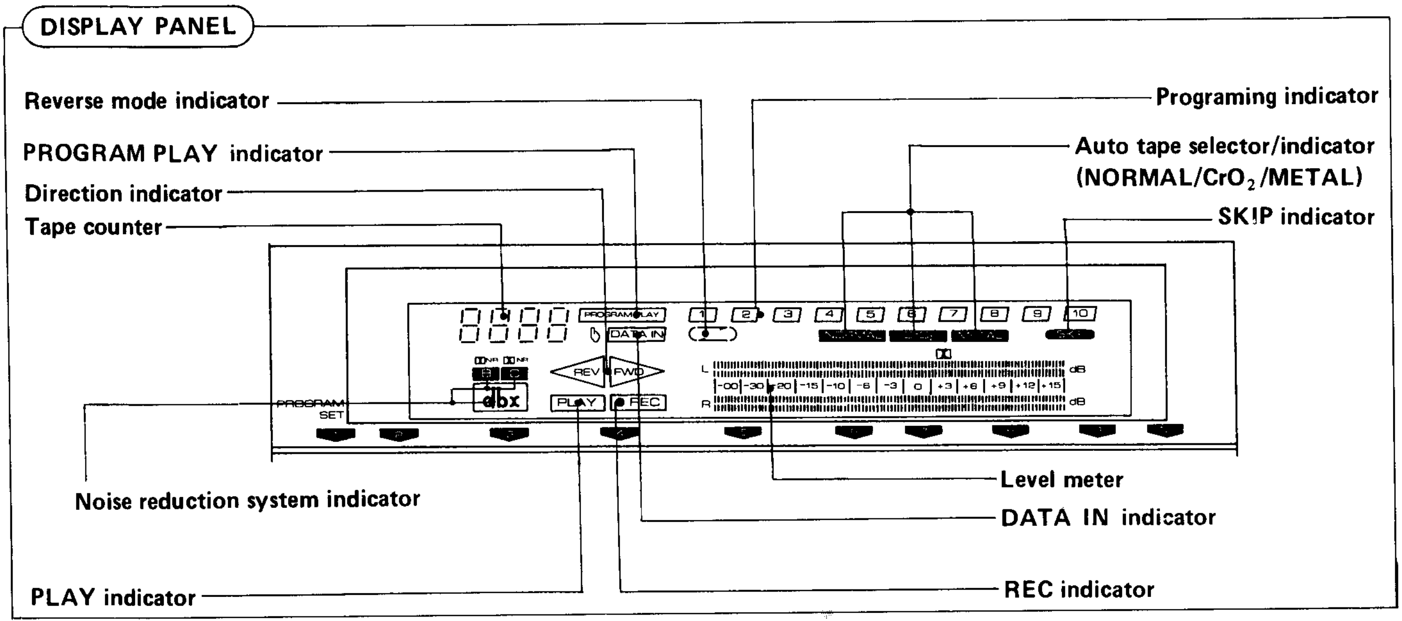
Tape SIDE B selector switch

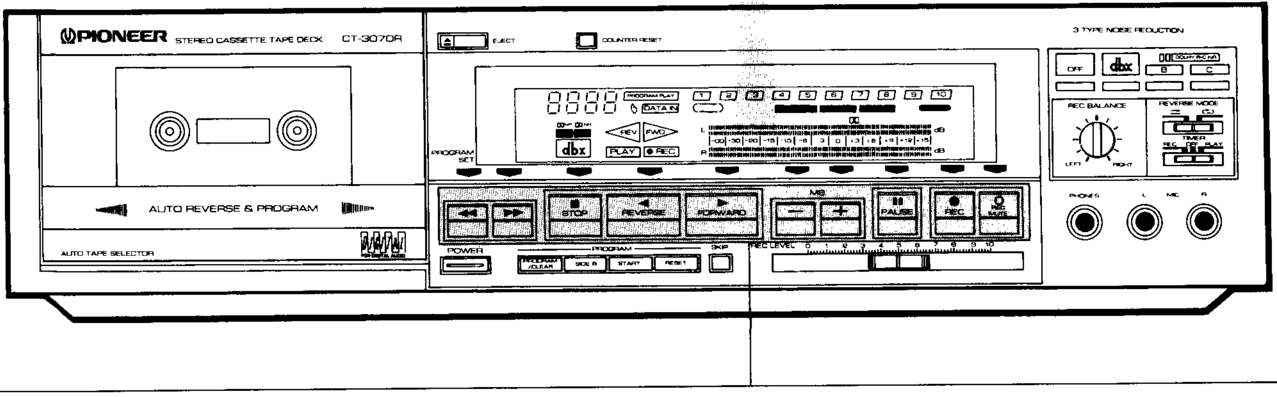
Press when performing random programmed playback of selections on the tape's side B.

Programmed play START switch

Press to start programmed playback.

DISPLAY PANEL


Reverse mode indicator
PROGRAM PLAY indicator
Direction indicator
Tape counter
Programing indicator
Auto tape selector/indicator (NORMAL/CrO₂/METAL)
SKIP indicator
PROGRAM PLAY
DATA IN
REV
FWD
dbx
PLAY
● REC
PROGRAM SET
L
R
dB
Level meter
DATA IN indicator
Noise reduction system indicator
PLAY indicator
REC indicator


PIONEER
STEREO CASSETTE TAPE DECK CT-3070R
EJECT
COUNTER RESET
3 TYPE NOISE REDUCTION
AUTO REVERSE & PROGRAM
AUTO TAPE SELECTOR
STOP
REVERSE
FORWARD
MS
PAUSE
REC
REC MUTE
POWER
PROGRAM
SKIP
REC LEVEL
OFF
dbx
REC BALANCE
REVERSE MODE
TIMER
LEFT
RIGHT
PHONES
L
MIC
R

Operating switches/Programming switches

These switches are used for operating deck, and also for programming selections for random programmed playback.

[When used as operating switches]

◀◀ : Rewind switch

▶▶ : Fast forward switch

■ : STOP switch

◀ : REVERSE switch. Press to play back the reverse side of the tape (the side opposite from the side visible in the holder).

▶ : FORWARD switch. Press to play back the forward side of the cassette tape (the side visible in the holder).

− : Press when performing skip search and music search.
+

▮▮ : PAUSE switch. Press to temporarily stop the tape travel. To restart the tape travel, press once again. The pause function does not operate when the deck is in the fast forward or rewind mode.

● : REC switch. The deck cannot be placed in the recording mode if a cassette with broken erasure prevention tabs is loaded, or if no cassette is loaded.

○ : REC MUTE switch. Press during recording to eliminate unwanted portions, or to create a non-recorded interval between tracks.

[When used as programming switches]

Used during random programmed play operation.

- Noise reduction manufactured under license from Dolby Laboratories Licensing Corporation.
- "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

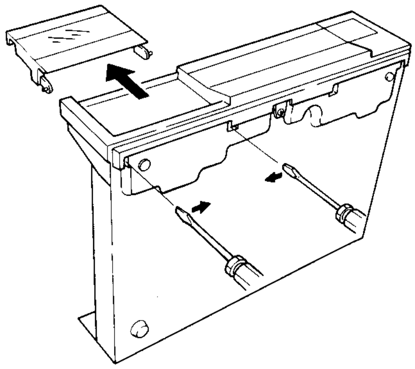
- dbx is a trademark of DBX incorporated.

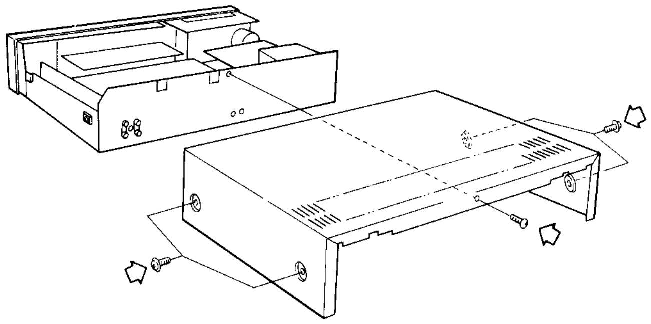
3. DISASSEMBLY

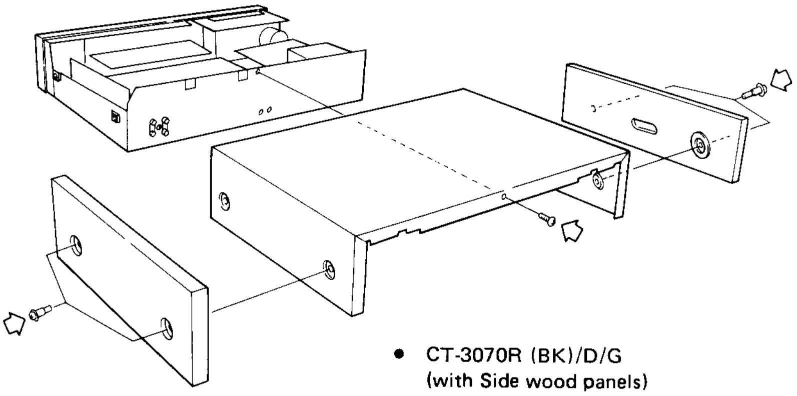
Disassembly of The Tape Transport Unit

1. Remove The Bonnet Case
   Undo the screws in the left and right hand sides of the bonnet case (two screws per side) and the screw in the top center of the rear panel. The side wood panels in CT-3070R (BK)/D/G are disassembled and reassembled together with the bonnet.

2. Remove The Door
   Stand the set upright and insert screwdrivers into the gaps between the front panel and the chassis in the bottom of the set. By bending the hinge sections of the door towards the center of door, the door can be pulled out in the direction of the arrows.

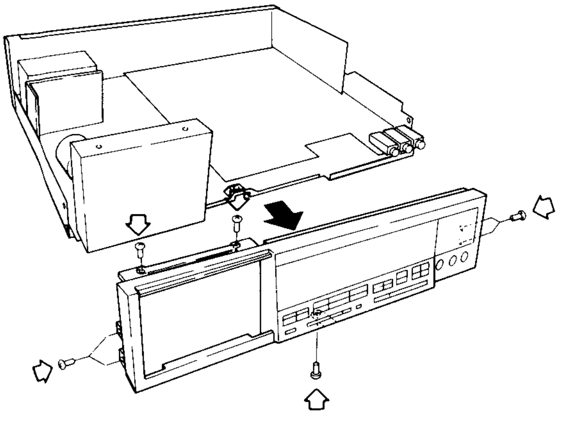




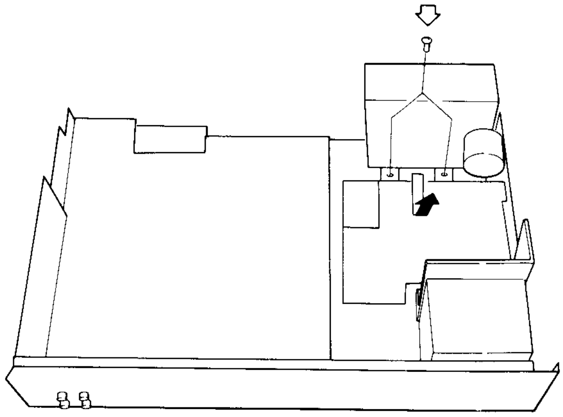


- CT-3070R (BK)/D/G
  (with Side wood panels)

3. Remove The Front Panel
   Undo the setscrews in the top of the tape transport unit and the setscrews in the left and right hand sides (two screws each side) and then pull the front panel out forwards.

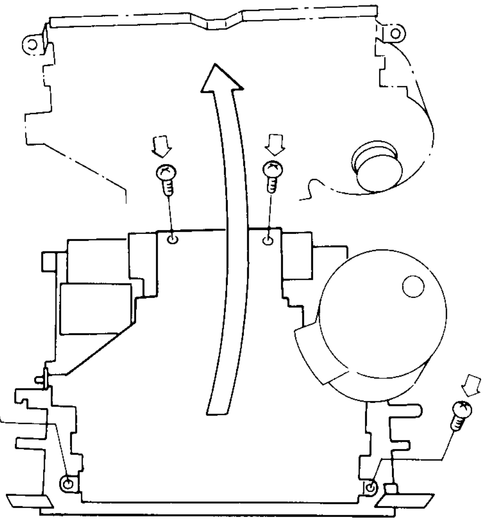


4. Remove The Tape Transport Unit
   Undo the two setscrews securing tape transport unit, and then remove unit by swivelling the unit base back and up.

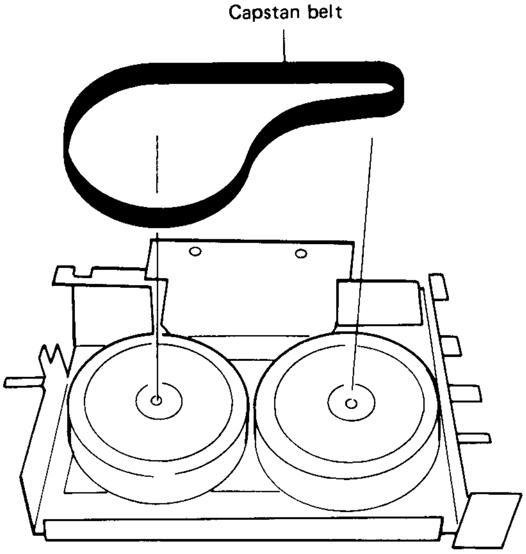


Belt Replacement

1. Remove The Tape Transport Unit from The Chassis (See page 6.)
2. Remove The Motor Bracket
   Undo screws in all four coners to remove the motor bracket from the chassis.

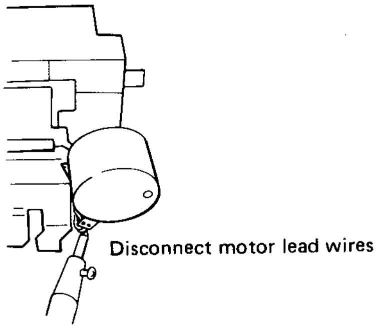


3. Replace The Belt, and Reassemble in The Reverse Order

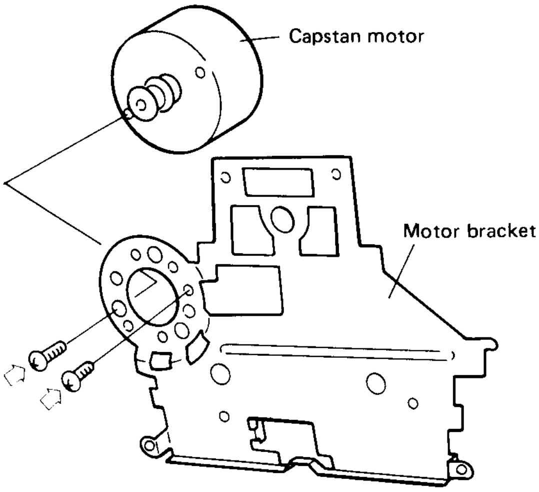

Capstan belt

Capstan Motor Replacement

1. Remove The Tape Transport Unit from The Chassis (See page 6.)
2. Disconnect The Motor Lead Wires from The motor


Disconnect motor lead wires

3. Remove The Motor Bracket
   (See step 2 in previous procedure.)
4. Remove Bracket from The Motor, and Replace The Motor

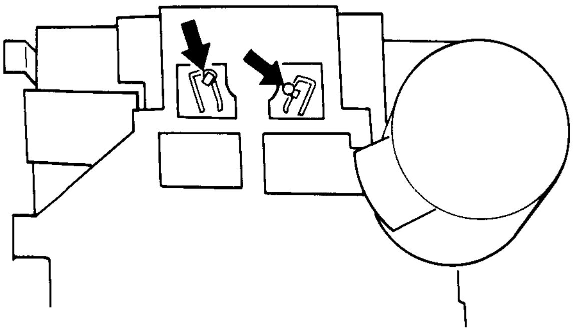

Capstan motor
Motor bracket

5. Reassemble in The Reverse Order
   (Making sure that the motor is mounted in the correct direction.)

Reel Motor Replacement

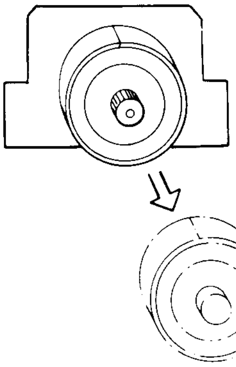
1. Remove The Tape Transport Unit from The Chassis (See page 6.)
2. Remove The Motor Bracket (See page 7.)
3. Disconnect The Jumper Leads from The Reel Motor Terminals (Using a soldering iron.)

Remove the terminal connection leads

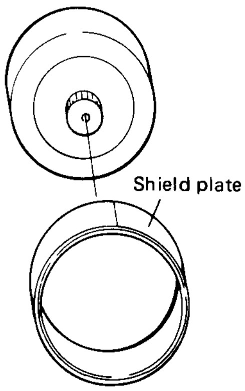


4. Remove The Reel Motor from The Circuit Board, And Also Remove The Shield Plate.

Remove reel motor from circuit board



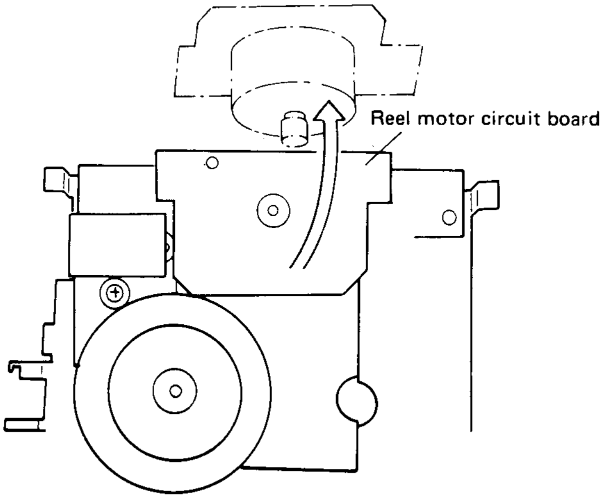
Remove shield plate



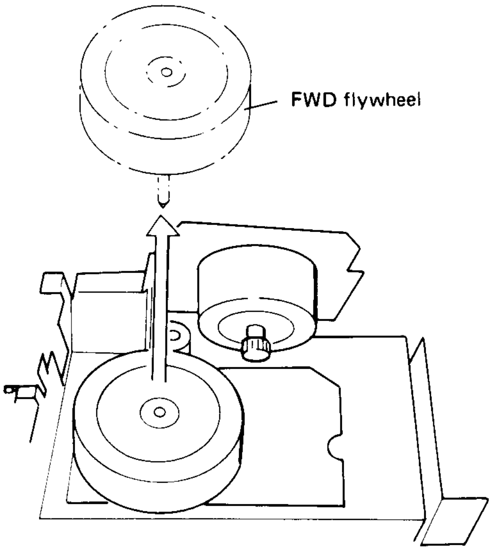
5. Fit The Shield Plate onto A New Motor And Fix into Position with Bond.
6. Secure by Wrapping Mylar Tape Around The Outside.
7. Reassemble in The Reverse Order.
   (Reversing the operations in Step 3 thru 1)

Assist Motor Replacement

1. Remove The Tape Transport Unit from The Chassis (See page 6.)
2. Remove The Motor Bracket (See page 7.)
3. Remove The Reel Motor (Together with Its Circuit Board) from The Chassis.

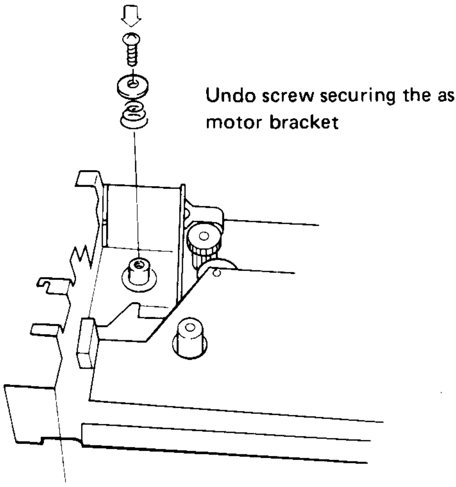


4. Remove The FWD Flywheel



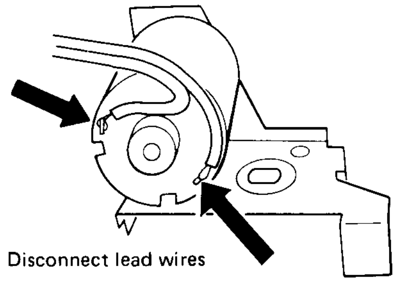
Continued on the next page.

5. Remove The Assist Motor (Togehter with Corresponding Bracket) from The Chassis.



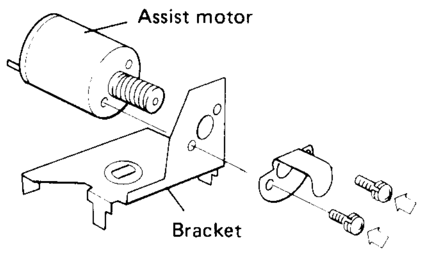
Undo screw securing the assist motor bracket

6. Disconnect The Lead Wires from The Terminals with A Soldering Iron.



Disconnect lead wires

7. Remove The Assist Motor from The Bracket



8. Remove The Shield Plate from The Old Motor And Wind And Secure It onto A New Motor.

9. Mount The New Motor into The Bracket.

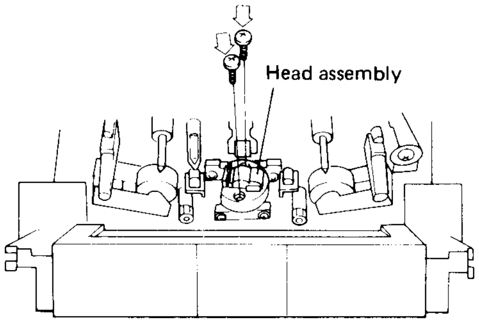
10. Apply Grease to The Worm Gear And to The End of Motor Axle.

11. Reassemble in The Reverse Order (Reversing The Operations in Steps 6 thru 1).

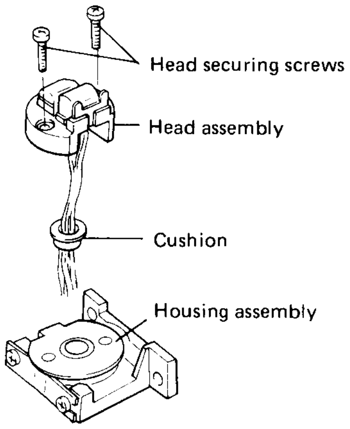
Head Replacement

1. Remove The Tape Transport Unit from The Chassis (See page 6.)

2. Undo The Screws Securing The Head, And Remove The Head Assembly.



3. Remove The Cushion from The Lead Wires, And Then Pass Lead Wires from A New Head Through The Cushion (Making Sure That The Leads Are Passed in The Right Direction)



4. Reassemble in The Reverse Order.

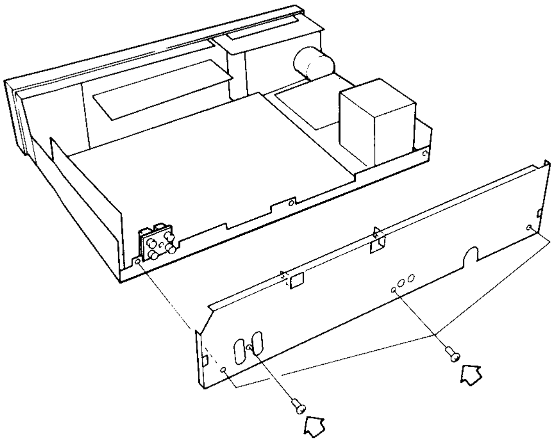
5. Proceed with Tape Transport And Electrical Adjustments.

Note: After completing the head replacement procedure, always ensure that the securing screws are sealed.

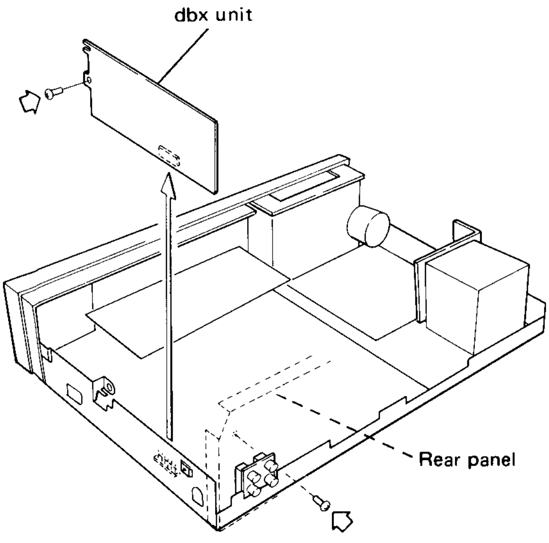
Main Unit Removal

1. Remove The Bonnet (See page 6.)

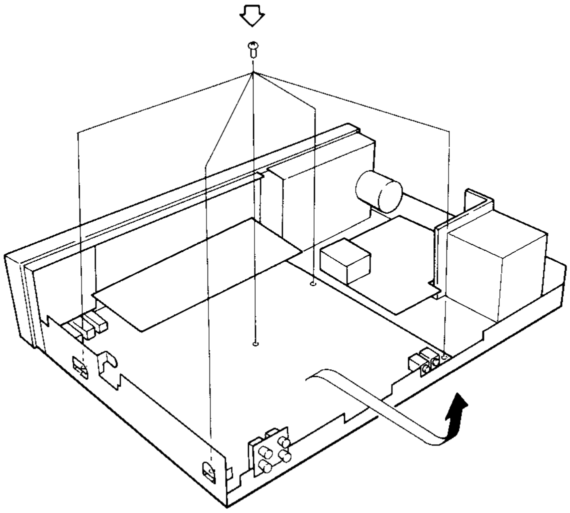
2. Remove The Rear Panel
   Undo the three setscrews in the rear panel and a setscrew securing the 4-pin jack. Then release the rear panel hooks by lifting up.



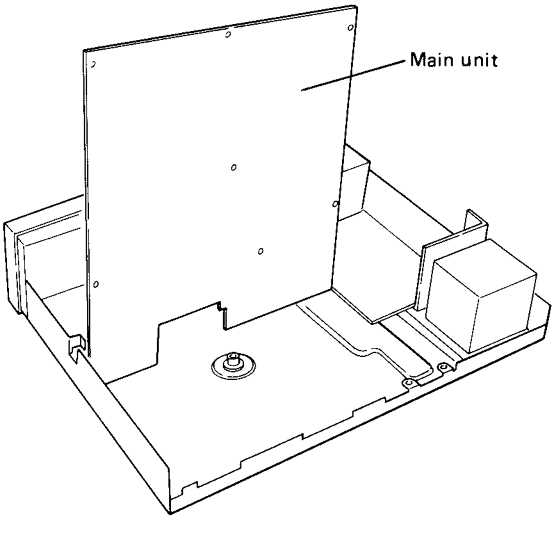
3. Remove The dbx Unit
   Undo the one setscrew to remove the dbx unit.
   (Undo the one setscrew in the rear panel if the rear panel has been not removed.)



4. Remove The Main Unit
   Undo five screws securing the Main unit, and then lift the rear side of the Main unit and pull out backwards.

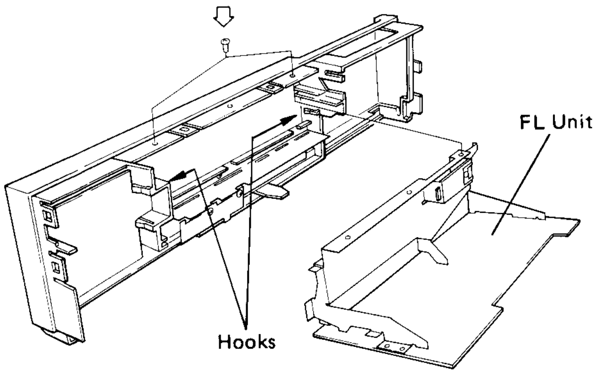


5. Stand The Main Unit
   Cut out wires ties properly and raise up the Main unit.



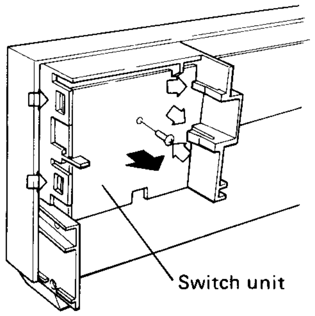
FL Unit Removal

1. Remove The Bonnet (See page 6.)
2. Remove The Door (See page 6.)
3. Remove The Front Panel (See page 6.)
4. Remove The FL Unit
   Undo two setscrews at the top and then disengage the two hooks projecting from the inside of the front panel.



Switch Unit Removal

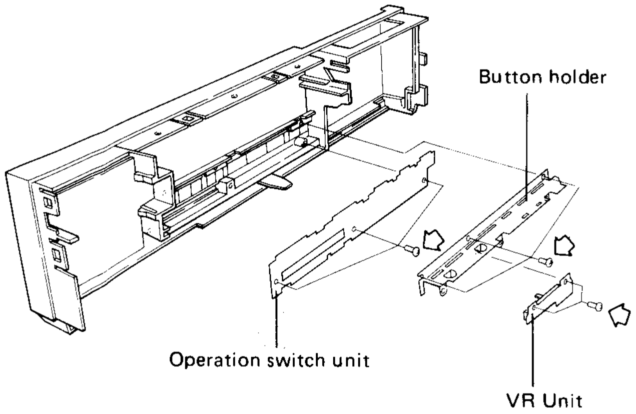
1. Remove The Bonnet (See page 6.)
2. Remove The Door (See page 6.)
3. Remove The Front Panel (See page 6.)
4. Remove The Switch Unit
   Undo the one screw securing the switch unit, and then disengaging the two hook catches and the two inserting sections, pull the unit out toward the rear.



VR Unit and Operation Switch Unit Removal

1. Remove The Bonnet (See page 6.)
2. Remove The Door (See page 6.)
3. Remove The Front Panel (See page 6.)
4. Remove The VR Unit
   Undo the two screws securing the VR unit.
5. Remove The Operation Switch Unit
   Undo the three setscrews, and then remove the unit from the button holder by swivelling towards the rear.

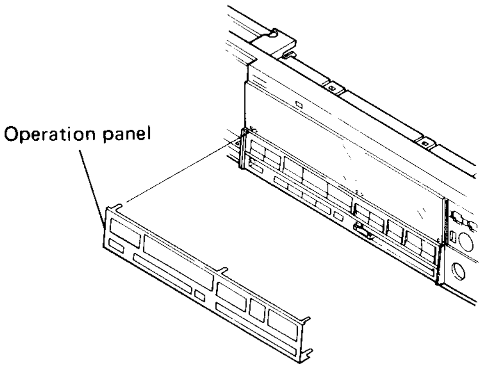
(● Undo the three screws securing the button holder.)



Operation Panel Removal

1. Remove The Bonnet (See page 6.)
2. Remove The door (See page 6.)
3. Remove The Front Panel (See page 6.)
4. Remove The Operation Panel
   Straighten the operation panel holding bends from the rear of the front panel, and remove the operation panel (struck by the dual-sided adhesive tape).

Note: If the operation panel is removed, it is not used again.

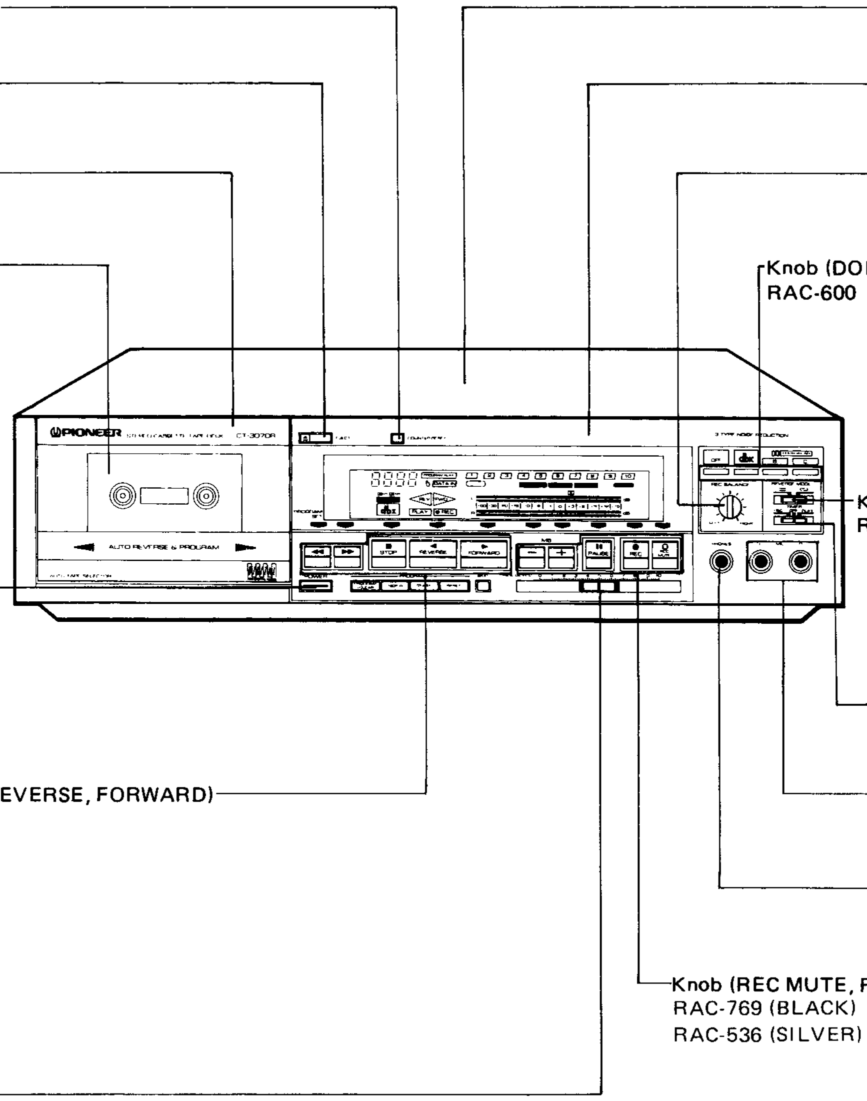


4. PARTS LOCATION

NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Front Panel View



Knob (COUNTER RESET)
RAC-545

Knob (EJECT)
RAC-589 (BLACK)
RAC-590 (SILVER)

Door
RNL-263 (BLACK)
RNK1001 (SILVER)

Door LENS
RAH-860 (BLACK)
RAH1011 (SILVER)

Knob (POWER)
RAC-771 (BLACK)
RAC1015 (SILVER)

Knob (FF, REW, STOP, REVERSE, FORWARD)
RAC-770 (BLACK)
RAC-538 (SILBER)

Knob (REC LEVEL)
RAC-544 (BLACK)
RAC-543 (SILVER)

Bonnet
RNA-700 (BLACK)
RNA-701 (SILVER)

Front panel assembly
RXX-543 (BLACK)
RXX1003 (SILBER)

Knob (REC BALANCE)
RAC-547

Knob (DOLBY NR, B, C, dbx, OFF)
RAC-600

Knob (REVERSE MODE)
RAC-548

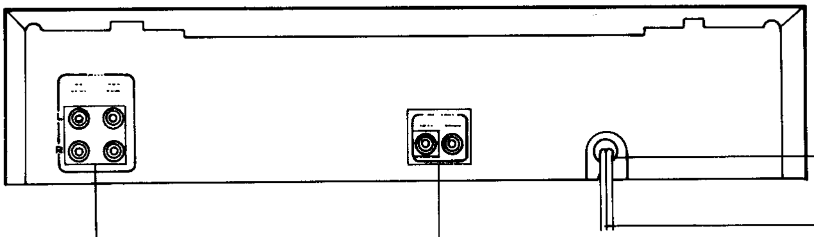
Knob (TIMER)
RAC-549

Phone jack (MIC)
RKN-092

Phone jack (PHONES)
RKN-096

Knob (REC MUTE, REC, PAUSE, MS+, MS–)
RAC-769 (BLACK)
RAC-536 (SILVER)

Rear Panel View



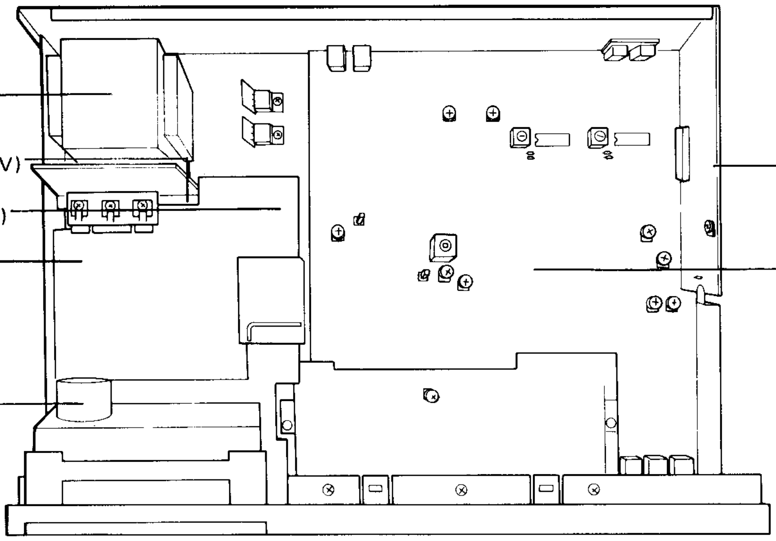
⚠ Strain relief
CM-22B

⚠ AC power cord
RDG1003

Terminal (LINE)
RKB-023

JA1, JA2 Mini jack (REMOTE CONTROL)
RKN-071

Top View



⚠ ★ Power transformer
(220V/240V)
RTT-418

⚠★★ Fuse(FU1, T315mA/250V)
REK-052

⚠★★ Fuse (FU2, T1.6A/250V)
REK-069

Power supply unit

★★ Capstan motor
RXM-125

dbx. unit

Main unit

5. EXPLODED VIEW AND PARTS LIST

NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
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- *Parts marked by "⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Parts List of Exploded View

- (BK): CT-3070R [BK] (Black)
- (SL) : CT3070R (Silver)

Mark	No.	Part No.	Description
	1	....	....
	2	RBL-137	Eject spring
	3	RBM-014	Nylon rivet
⚠ ★	4	RTT-418	Power transformer (220V/240V)
⚠	5	RDG1003	AC Power cord
⚠	6	CM-22B	Strain relief
⚠★★	7	REK-052	Fuse (FU1, T315mA/250V)
⚠★★	8	REK-069	Fuse (FU2, T1.6A/250V)
	9		
	10	RAC-769 (BK) RAC-536 (SL)	Knob (MS+, MS–, PAUSE, REC, REC MUTE)
	11	RAC-770 (BK) RAC-538 (SL)	Knob (FF, REW, STOP, REVERSE, FORWARD)
	12	....	....
	13	RAC-544 (BK) RAC-543 (SL)	Knob (REC LEVEL)
	14	RAH-862 (BK) RAH1012 (SL)	Operation panel
	15	REE-113	Remain display paper
	16	RAC-545	Knob (COUNTER RESET)
	17	RAC-771 (BK) RAC1015 (SL)	Knob (POWER)
	18	RAC-589 (BK) RAC-590 (SL)	Knob (EJECT)
	19	RNL-263 (BK) RNK1001 (SL)	Door
	20	BBZ30P080FMC	Screw
	21	RAH-865	Door plate
	22	RAH-863	NR Plate
	23	RAC-548	Knob (REVERSE MODE)
	24	RAC-549	Knob (TIMER)
	25	RAC-547	Knob (REC BALANCE)
	26	RAC-600	Knob (DOLBY NR, B, C, dbx, OFF)
	27	RNA-700 (BK) RNA-701 (SL)	Bonnet
	28	REC-369	Leg assembly
	29	RNM-046	Leg
	30	RXX-542 (BK) RXX1002 (SL)	Door assembly
	31	RAH-644	Cassette plate
	32	RXX-543 (BK) RXX1003 (SL)	Front panel assembly
	33	PMA30P060FMC	Screw
	34	BCT26P100FZK	Screw
	35	FBT40P080FZK RBA-093	Screw 4 x 8 (without D/G type) Screw (for D/G type)
	61		Tape transport unit
	62		Chassis
	63		Heat sink
	64		Switch holder
	65		Cover
	66		VR Shaft
	67		Pocket holder
	68		Knob plate
	69		Cushion (A)
	70		FL Unit
	71		Reset switch unit
	72		dbx unit
	73		Power supply unit
	74		Transistor unit A
	75		Transistor unit B
	76		Power switch unit
	77		Main unit
	78		Switch unit
	79		Operation switch unit
	80		VR Unit
	81		Meter screen
	82		Rear panel
	83		Grounding lead wire
	84		Stand
	85		VR plate
	86		Side wood (L) (D/G type only)
	87		Side wood (R) (D/G type only)
	88		Door panel
	89		Meter panel

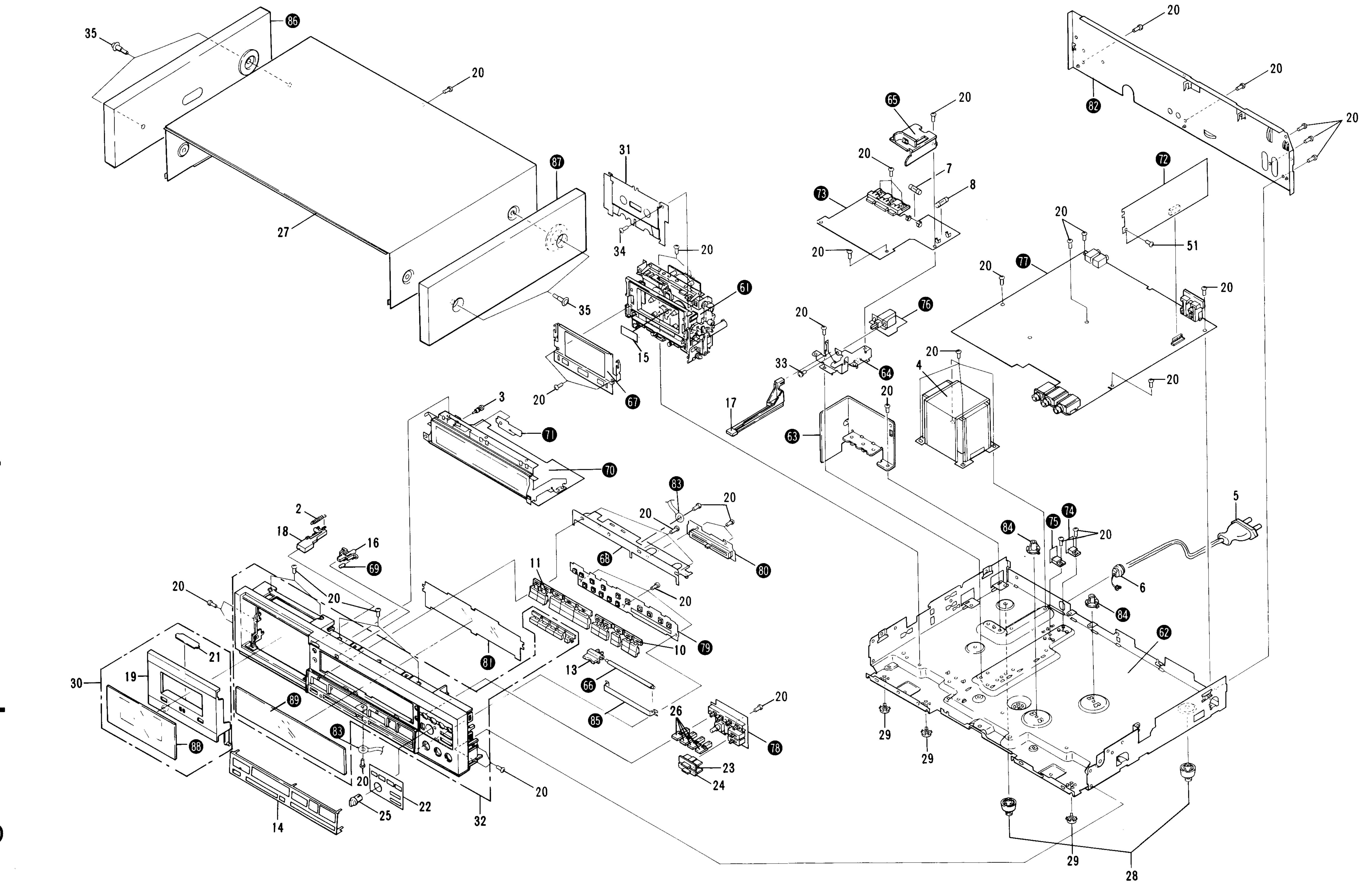
Exterior Components

A

B

C

D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A

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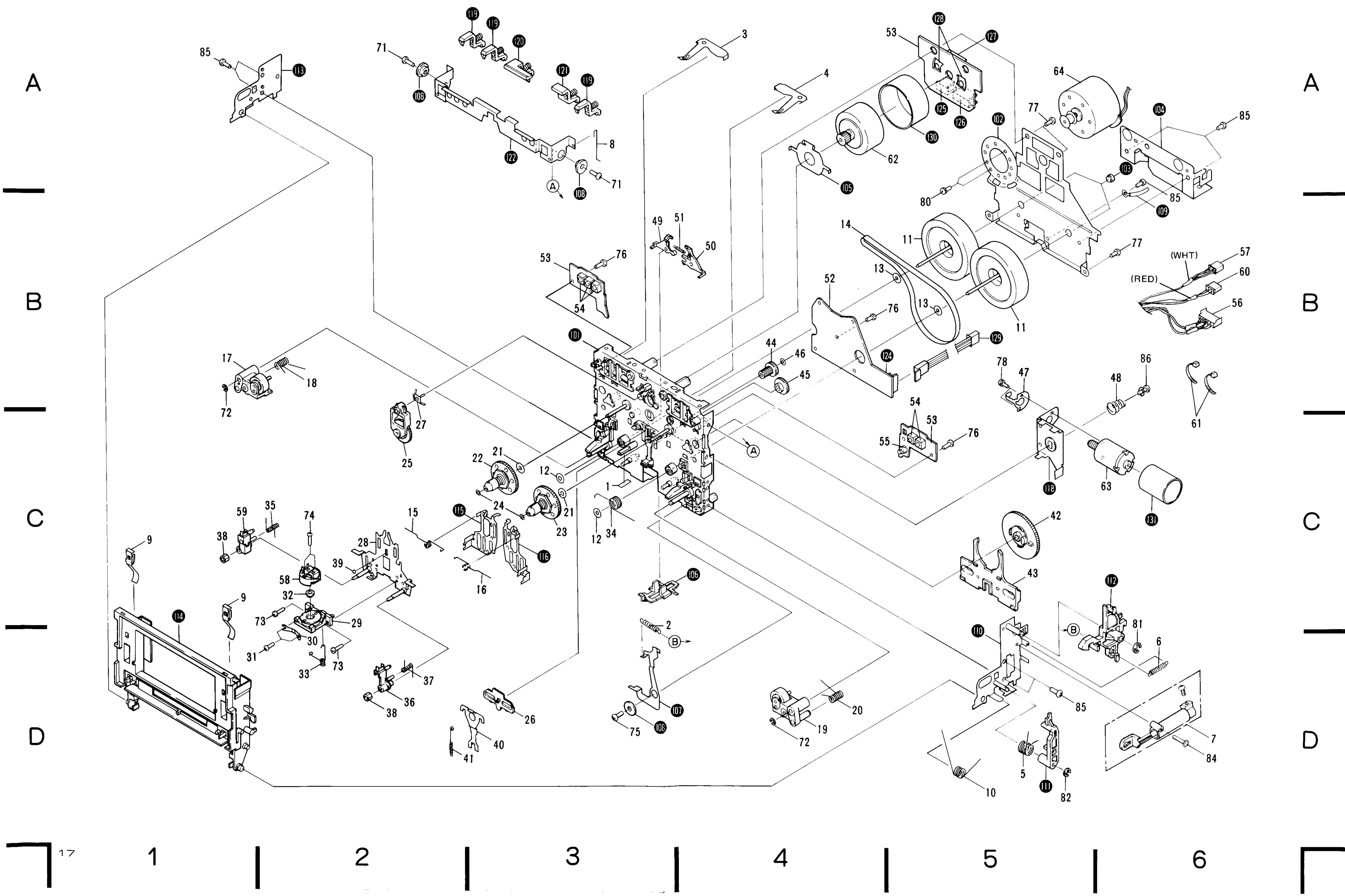
C

D

Tape Transport Unit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NOTES:

- *Parts without part number cannot be supplied.*
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  ★★ GENERALLY MOVES FASTER THAN ★
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Parts List of Tape Transport Unit

Mark	No.	Part No.	Description
	1	REF-025	Reflection plate
	2	RBL-091	Eject prevention spring
	3	RBK-188	Hold spring (L)
	4	RBK-189	Hold spring (R)
	5	RBL-076	Stopper spring (R)
	6	RBL-077	Eject arm spring
	7	RXC-036	Damper assembly
	8	RBL-078	Rod (R)
	9	RNH-349	Hold spring
	10	RBL-079	Door spring (R)
	11	RXC-037	Flywheel assembly
	12	RBF-030	Oil stopper washer
	13	WA26D045D025	Washer
★★	14	REB1001	Capstan belt
	15	RBL-080	SB spring (L)
	16	RBL-081	SB spring (R)
★★	17	RXC-038	Pinch roller assembly (L)
	18	RBL-082	Pinch roller spring (L)
★★	19	RXC-039	Pinch roller assembly (R)
	20	RBL-083	Pinch roller spring (R)
	21	WA21D070D013	Washer
	22	RXC-040	Reel base assembly
	23	RXC-075	TU reel base assembly
	24	RBF-057	Washer
★★	25	RXC-041	Idler assembly
	26	RNL-926	C/R slide plate
	27	RBK-191	Damper spring
	28	RXC-042	Head base plate
	29	RXC-043	Head housing assembly
	30	RBK-184	Azimuth spring
	31	RBA-092	Azimuth screw
	32	REB-521	Cushion
	33	RBL-085	Rotator spring
	34	RBL-086	HB spring
	35	RBL-087	Spring (L)
	36	RNL-929	Tape guide
	37	RBL-088	Spring (R)
	38	RNL-930	Nut
	39	REF-024	Steel ball
	40	RBK-185	Hold spring
	41	RBL-089	CR slide spring
	42	RXC-044	Gear assembly
	43	RNL-932	Switching slide plate
	44	RNM-103	Worm gear
	45	RNL-934	Idler gear
	46	RBF-057	Washer
	47	RBK-187	Thrust spring
	48	RBL-090	BKT spring
	49	RNL-936	Brake lever (L)
	50	RNL-937	Brake lever (R)
	51	RBL-092	Brake spring
	52	RNR-321	Sensor panel
	53	RNR-270	P.C. board
★★	54	RSG-183	Tact switch
★	55	NJL5141E	Photo-interrupter
	56	RKS-029	Connector (6-P)
	57	RKS-030	Connector (3-P)
★★	58	RPB-131	Tape head assembly
★★	59	RXC-180	Sensor assembly
	60	RKS-031	Connector (3-P)
	61	REC-371	Wire tie
★★	62	RXM-122	Reel motor assembly
★★	63	RXM-134	Assist motor assembly
★★	64	RXM-125	Capstan motor assembly
	71	PCZ30P040FMC	Screw 3 x 4
	72	YE20FUC	Washer E-type
	73	PMA20P050FMC	Screw 2 x 5
	74	PMZ14P050FNi	Screw 1.4 x 5
	75	PCZ30P060FMC	Screw 3 x 6
	76	PRZ20P060FMC	Screw 2 x 6
	77	PRZ26P080FMC	Screw 2.6 x 8
	78	PMA20P030FZB	Screw 2 x 3
	79	....	....
	80	PMA26P040FMC	Screw 2.6 x 4
	81	YE30FUC	Washer E-type
	82	YE25FUC	Washer E-type
	83	....	....
	84	ICZ20P120FUC	Screw 2 x 12
	85	PCZ30P050FMC	Screw 3 x 5
	86	ARZ26P080FMC	Screw 2.6 x 8
	101		Chassis
	102		Motor bracket
	103		Thrust screw
	104		Hold plate
	105		Grounding plate
	106		Wire holder
	107		Eject prevention arm (R)
	108		Spacer
	109		Cord fixer
	110		Bracket assembly

● **Continued on the next page bellow.**

Continued from the preceding page

Mark	No.	Part No.	Description
	111		Stopper (R)
	112		Eject arm (R)
	113		Side plate (A)
	114		Door frame
	115		Slide base (L)
	116		Slide base (R)
	117		....
	118		Assist motor bracket (R)
	119		REC detector assembly
	120		Metal detector assembly
	121		Eject detector assembly
	122		Detector arm
	123		Spacer

Mark	No.	Part No.	Description
	124		Connector (6-P)
	125		Connector (3-P)
	126		Connector (6-P)
	127		Connector (7-P)
	128		Jumper wire
	129		Connector (6-P)
	130		Shield plate
	131		Shield plate

6. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

  560Ω 56×10^1 *561 .... RD¼PS* $\boxed{5}\ \boxed{6}\ \boxed{1}$ *J*
  47kΩ 47×10^3 *473 .... RD¼PS* $\boxed{4}\ \boxed{7}\ \boxed{3}$ *J*
  0.5Ω 0R5 .... RN2H $\boxed{0}\ \boxed{R}\ \boxed{5}$ *K*
  1Ω 010 .... RS1P $\boxed{0}\ \boxed{1}\ \boxed{0}$ *K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

  5.62kΩ 562×10^1 *5621 .... RN¼SR* $\boxed{5}\ \boxed{6}\ \boxed{2}\ \boxed{1}$ *F*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Miscellaneous Parts

P.C. BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
	Main unit	Non supply
	Switch unit	Non supply
	Operation switch unit	Non supply
	VR Unit	Non supply
	Power supply unit	Non supply
	Transistor A unit	Non supply
	Transistor B unit	Non supply
	Power switch unit	Non supply
	FL Unit	Non supply
	Reset switch unit	Non supply
	dbx unit	Non supply
	Tape transport unit	Non supply

FUSES

Mark	Symbol & Description	Part No.
⚠★★	FU1 Fuse (T315mA/250V)	REK-052
⚠★★	FU2 Fuse (T1.6A/250V)	REK-069

TAPE TRANSPORT UNIT

Mark	Symbol & Description	Part No.
★★	S1501 Tact switch (AR-REV)	RSG-183
★★	S1502 Tact switch (DOOR)	RSG-183
★★	S1503 Tact switch (AR-FWD)	RSG-183
★★	S1504 Tact switch (METAL DET.)	RSG-183
★★	S1505 Tact switch (CrO2 DET.)	RSG-183
★★	CM Capstan motor	RXM-125
★★	RM Reel motor	RXM-122
★★	AM Assist motor	RXM-134
★★	Sensor assembly (Leader tape DET.)	RXC-180
★★	Tape head assembly	RPB-131
★★	Photo-interrupter (Tape end DET.)	NJL5141E

OTHERS

Mark	Symbol & Description	Part No.
⚠ ★	T1 Power transformer (AC220V/240V)	RTT-418
⚠	AC Power cord	PDG1003
⚠	Strain relief	CM-22B
⚠	C1402 (0.01/AC400V)	RCG-009

Main Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC330	PD3031A
★★	IC331	LC7800
★★	IC114, IC214	AN7370K
★★	IC113	M5220L
★★	IC115, IC118, IC119	M5218L
★★	IC332	TC5066BP
★★	IC324, IC325	BA6109
★★	IC327	M5233P
★★	IC326	BA335
★★	Q101 – Q108, Q116, Q201 – Q208, Q216, Q301, Q305, Q309, Q314, Q317, Q320 – Q323	2SC1740S
★★	Q304	2SC3246
★★	Q306, Q307, Q315, Q318, Q319	2SA933S
★★	Q302–Q303	2SC2060
★★	Q117, Q217	2SC2240
★★	Q110, Q111, Q210, Q211	2SK246
★★	Q109, Q112, Q209, Q212	2SJ103
★	D301–D305, D307–D322, D324 – D330	1SS254
⚠ ★	D306	1SR35-100A
⚠ ★	D323	RD3.0FB1

COILS

Mark	Symbol & Description	Part No.
	L301 OSC Coil	RTD-044
	L103, L203 Trap coil	RTF-152
	F101, F201 MPX Filter	RTF-138
	L104, L204 Peaking coil (5.6mH)	RTF-125
	L105, L205 Trap coil	RTF-153
	L102, L202 Coil (36mH)	RTF-155

CAPACITORS

Mark	Symbol & Description	Part No.
	C129, C229, C323	CEASR10M50
	C122, C222	CEJAR15M50
	C130, C230, C140, C240	CEJAR33M50
	C123, C223, C176, C276, C316	CEASR47M50
	C138, C238, C174, C274, C311, C325, C335	CEAS010M50
	C132, C142, C232, C242, C315	CEAS4R7M50
	C107, C113, C120, C124, C125, C133, C135, C136, C141, C148, C150 – C152, C178, C207, C213, C220, C224, C225, C233, C235, C236, C241, C248, C251, C252, C278, C308, C317	CEAS100M50
	C104, C106, C137, C204, C206, C149, C304, C313, C320, C334, C342	CEAS330M35
	C175, C309, C310, C314, C344	CEAS470M25
	C177, C277, C275	CEAS101M25
	C114, C214	CEAS471M16
	C111, C112, C211, C212, C172, C272	CEANL010M50
	C102, C202	CEANL100M16
	C109, C209	CQMA222J50
	C322, C331, C147, C247, C146, C246	CQMA682J50
	C126, C226	CQMA182J50
	C110, C210, C306, C307, C145, C245	CQMA332J50
	C118, C218	CQMA472J50
	C116, C216	CQMA822J50
	C105, C127, C205, C227	CQMA103J50
	C139, C239	CQMA102J50
	C144, C244	CQMA123J50
	C108, C208	CQMA153J50
	C305	CQMA223J50
	C115, C119, C215, C219	CQMA273J50
	C117, C128, C217, C228, C324	CQMA333J50
	C321	CQMA104K50
	C303	CQPA183J100
	C101, C201	CQSA821J50
	C318, C319	CCDCH300J50
	C301, C302	CCDSL221K500
	C103, C131, C134, C173, C203, C231, C234, C273, C333, C336	CCDSL101J50
	C143, C243	CCDSL221J50
	C121, C171, C221, C271	CKDYB471K50
	C312, C326, C327, C329, C337 – C341, C343, C345	CKDYF103Z50
	C170, C270	CKDYF473Z50
	C328, C330	CKDYX104M25

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	VR101, VR201, VR303 Semi-fixed (10k-B)	VRTB6VS103
★	VR102, VR103, VR202, VR203 Semi-fixed (22k-B)	VRTB6VS223
★	VR301, VR302 Semi-fixed (150k-B)	VRTB6VS154
	R339 Resistor network (10k x 6, 22k x 2)	RCX-029
	R346 Resistor network (22k x 4, 22k x 4)	RCX-028
	R338 Resistor network (22k x 7)	RM7-223J
⚠	R108, R276, R308	RD1/2PMF □□□J
	R102–R105, R109, R133, R134, R141, R146, R147, R150, R170, R171, R173–R176, R178–R181, R203–R205, R209, R212, R213, R233, R234, R241, R263, R266, R270, R271, R273–R275, R277–R280, R285, R301, R302, R309, R313, R317, R323, R333, R337, R344, R345, R349, R353–R355, R367, R369, R370, R329, R343	RD1/4PM□□□J
	R172, R272	RD1/4PM394JNL
	Other resistors	RD1/6PM □□□J

OTHERS

Mark	Symbol & Description	Part No.
★★	RY301 Reed relay	RSR-035
	Terminal (LINE) 4P	RKB-023
	JA101, JA202 Phone jack (MIC)	RKN-092
	Phone jack (PHONES)	RKN-096
★	X301 Ceramic resonator	RSS-035
	J20 Connector 8P	RKP-590
	JA1, JA2 Mini jack (REMOTE CONTROL)	RKN-071

Switch Unit

SWITCHES

Mark	Symbol & Description	Part No.
★★	S501 – S503 Push switch assembly B (dbx, DOLBY NR B,C)	RSG-171
★★	S504 Slide switch (TIMER)	RSH-064
★★	S505 Slide switch (REVERSE MODE)	RSH-066

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	V501 Variable (5k-B) (REC BALANCE)	RCS-030
	R501, R502	RD1/6PM □□□J

Operation Switch Unit

SWITCHES

Mark	Symbol & Description	Part No.
★★	S701 – S715 Tact switch (REW/1, FF/2, STOP/3, REV-PLAY/4, FWD-PLAY/5, MS-/6, MS+/7, PAUSE/8, REC/9, REC MUTE/10, PROGRAM/CLEAR, SIDE B, START, RESET, SKIP)	RSG-155

VR Unit

RESISTOR

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. before.

Mark	Symbol & Description	Part No.
★	V801 Slide variable (5k-A) (REC LEVEL)	RCW-014

Power Supply Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
⚠★★	Q401, Q402	2SD1276
⚠★★	Q404	2SD1265
★★	Q403, Q407, Q409, Q410, Q411, Q413	2SC1740S
★★	Q405, Q406, Q408, Q412	2SA933S
⚠ ★	D401	S4VB20F
⚠ ★	D418	1B2Z1-LC2
⚠ ★	D419	1B2C1-LC2
⚠ ★	D403 – D406	1SR35-100A
★	D407, D414 – D417, D420, D421	1SS254
⚠ ★	D409	RD15EB3 (MTZ15C)
⚠ ★	D410, D411	RD5.6EB2 (RD5.6EB3) (MTZ5.6B) (MTZ5.6C)
⚠ ★	D412	RD27EB1 (RD27EB2) (MTZ27A) (MTZ27B)
⚠ ★	D413	RD20EB1 (RD20EB2) (MTZ20A) (MTZ20B)

CAPACITORS

Mark	Symbol & Description	Part No.
	C429	CEA2R2M50
	C418	CEA3R3M50
	C427	CEA4R7M50
	C403, C432, C433	CEA100M16
	C412	CEA470M10
	C408, C413, C425, C426	CEA470M25
	C416	CEA470M50
	C414	CEA101M10
	C411	CEA101M16
	C402, C424	CEA101M25
	C420	CEA101M35
	C405, C428	CEA221M16
	C415	CEA221M50
	C410	CEA102M16
	C401, C407	CEA102M35
	C419	CEA472M16
	C404, C409, C417, C430, C431, C421–C423	CKDYF103Z50
	C406	CKDYF473Z50

RESISTORS

Note: When ordering resistors, convert the resistance valu into code form, and then rewrite the part no. as befor

Mark	Symbol & Description	Part No.
⚠	R406	RS1LF122J
⚠	R401, R403, R407, R408	RD1/2PMF □□□J
	R402, R404, R405, R414, R423	RD1/4PM □□□J
	Other resistors	RD1/6PM □□□J

OTHERS

Mark	Symbol & Description	Part No.
⚠	Fuse holder	RKR-024

Transistor Unit A

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
⚠★★	Q1301	2SD1265

Transistor Unit B

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
⚠★★	Q1201	2SD1265

Power Switch Unit

SWITCH

Mark	Symbol & Description	Part No.
⚠★★	S1401 Push switch (POWER)	RSA-063

CAPACITOR

Mark	Symbol & Description	Part No.
⚠	C1401, C1402 Ceramic (0.01/AC400V)	RCG-009

FL Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC603	LC7555
★★	IC604	TA7318P
★★	IC613	PDE004
★★	IC607–IC610	TC5066BP
★★	IC611, IC612	TC5067BP
★★	Q601, Q622, Q623	2SC1740S
★★	Q614 – Q616, Q618, Q624	2SA933S
★★	Q619 – Q621, Q625	DTC143XS
★	D601, D602	1SS254
⚠ ★	D607	MTZ9.1A (MTZ9.1B) (RD9.1EB1) (RD9.1EB2)

CAPACITORS

Mark	Symbol & Description	Part No.
	C605, C606	CEJAR22M50
	C604	CEAR47M50
	C602, C603	CEA010M50
	C607, C608	CEA4R7M50
	C613,	CEA100M16
	C614	CEA100M35
	C611	CEA470M25
	C601, C609	CEA330M16
	C610	CQMA102J50
	C615, C616	CKDYF103Z50
	C612	CQSA221J50

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	V601 Semifixed (150k-B)	VRTB6VS154
⚠	R603, R661	RD1/2PMF □□□J
	R638 – R641 Resistor network (10k x 7)	RM7-103J
	R619 Resistor network (47k x 14)	RM14-473J
	R614 – R618 Resistor network (100k x 12)	RCX-030
	Other resistors	RD1/6PM □□□J

OTHERS

Mark	Symbol & Description	Part No.
	FL tube tape	REH-014
	Nylon rivet	RBM-014
★	Fluorescent display tube	FIP13AW24Y

Reset Switch Unit

SWITCH

Mark	Symbol & Description	Part No.
★★	S1101 Push switch (COUNTER RESET)	RSG-155

dbx Unit

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC913	AN6291
★★	IC914	M5218L
★★	Q901 – Q912, Q915, Q919	2SC1740SLN
★★	Q916 – Q918	2SA933S
⚠ ★	D903	RD5.6EB1 (RD5.6EB2) (MTZ5.6A) (MTZ5.6B)
★	D901, D902	1SS254

CAPACITORS

Mark	Symbol & Description	Part No.
	C946	CEA101M16
	C947	CEA331M10
	C939, C940, C945	CEA330M16
	C925, C926, C948	CEA470M10
	C929, C930, C936, C943, C944	CEA100M16
	C949	CEA4R7M50
	C935, C937, C938	CEA010M50
	C917, C918 Electrolytic (10/16, NL)	RCH-069 (RCH-070)
	C919, C920 Electrolytic (0.68/50, NL)	RCH-073 (RCH-074)
	C913, C914	CEAR33M50
	C901, C902	CEAR22M50
	C941, C942	CCDSL181J50
	C903 – C906	CQMA104J50
	C915, C916	CQMA333J50
	C923, C924, C933, C934	CQMA223J50
	C927, C928	CQMA472J50
	C907 – C910	CQMA332J50
	C921, C922	CQSA471J50
	C931, C932	CQSA391J50
	C911, C912	CQSA331J50

RESISTORS

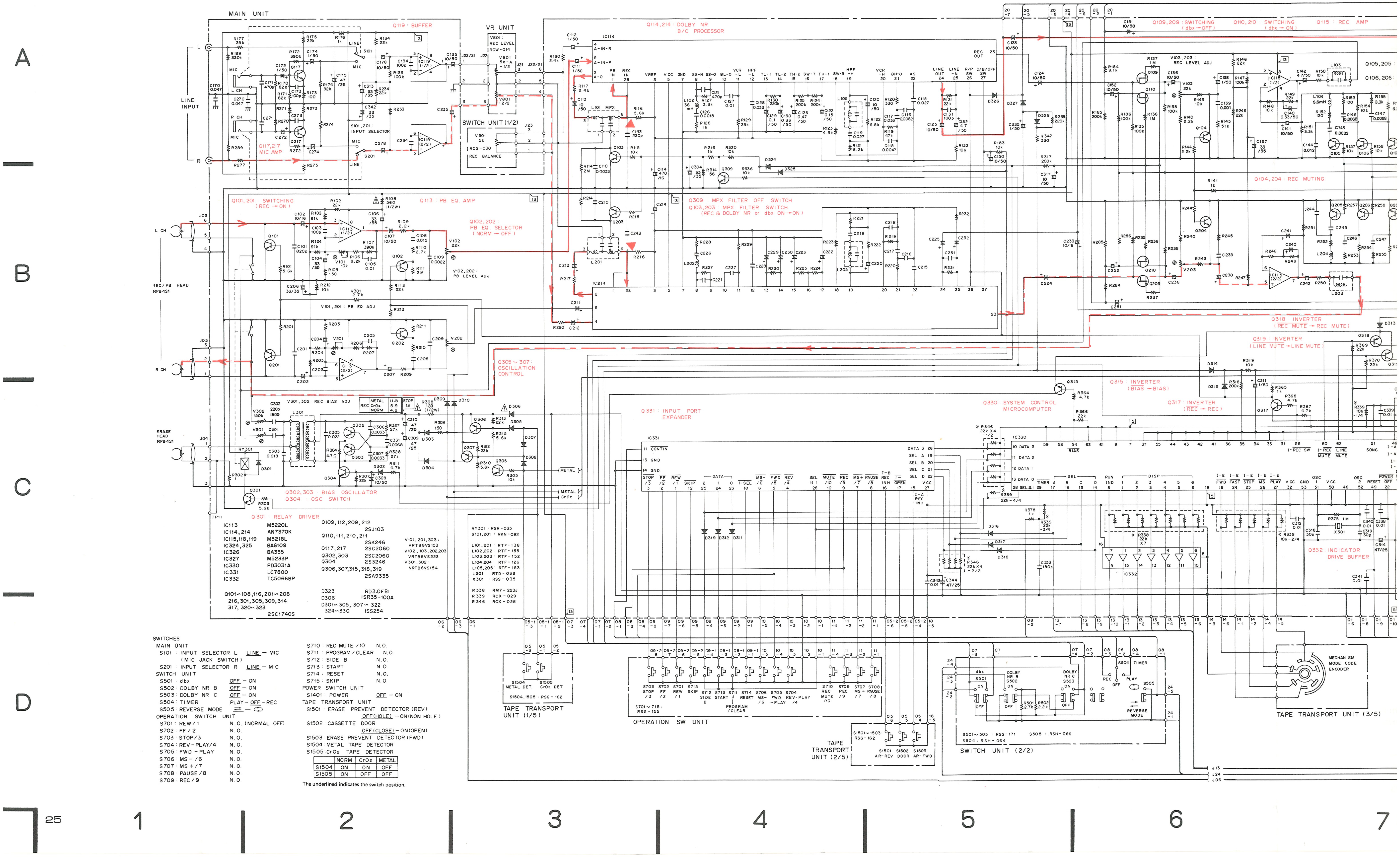
Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	V901 Semi-fixed (2.2k)	VRTB6VS222
	R912, R914, R942, R916, R958, R959, R957	RD1/4PM □□□J
	Other resistors	RD1/6PM □□□J

OTHERS

Mark	Symbol & Description	Part No.
	Connector socket 8-P	RKP-602

7. SCHEMATIC DIAGRAM


A
B
C
D
MAIN UNIT
LINE INPUT
L CH
R CH
Q119 : BUFFER
VR UNIT
V801 REC LEVEL RCW-014
SWITCH UNIT (1/2)
V501 5k RCS-030 REC BALANCE
Q117,217 MIC AMP
S101,201 INPUT SELECTOR
Q114,214 DOLBY NR B/C PROCESSOR
IC114
IC214
Q109,209 : SWITCHING (dbx → OFF)
Q110,210 : SWITCHING (dbx → ON)
Q115 : REC AMP
Q104,204 : REC MUTING
Q105,205
Q106,206
Q101,201 : SWITCHING (REC → ON)
Q113 : PB EQ AMP
Q102,202 : PB EQ SELECTOR (NORM → OFF)
V102,202 : PB LEVEL ADJ
V101,201 : PB EQ ADJ
Q309 : MPX FILTER OFF SWITCH
Q103,203 : MPX FILTER SWITCH (REC & DOLBY NR or dbx ON → ON)
REC/PB HEAD RPB-131
ERASE HEAD RPB-131
Q305 ~ 307 : OSCILLATION CONTROL
V301,302 : REC BIAS ADJ
Q302,303 : BIAS OSCILLATOR
Q304 : OSC SWITCH
Q301 : RELAY DRIVER
Q331 : INPUT PORT EXPANDER
IC331
Q330 : SYSTEM CONTROL MICROCOMPUTER
IC330
Q318 : INVERTER (REC MUTE → REC MUTE)
Q319 : INVERTER (LINE MUTE → LINE MUTE)
Q315 : INVERTER (BIAS → BIAS)
Q317 : INVERTER (REC → REC)
Q332 : INDICATOR DRIVE BUFFER
IC332
TAPE TRANSPORT UNIT (1/5)
S1504 METAL DET.
S1505 CrO2 DET
S1504,1505 : RSG-162
OPERATION SW UNIT
S701 ~ 715 : RSG-155
TAPE TRANSPORT UNIT (2/5)
S1501~1503 RSG-162
SWITCH UNIT (2/2)
S501~503 : RSG-171
S504 : RSH-064
S505 : RSH-066
MECHANISM MODE CODE ENCODER
TAPE TRANSPORT UNIT (3/5)
J13
J24
J06

IC113 M5220L
IC114,214 AN7370K
IC115,118,119 M5218L
IC324,325 BA6109
IC326 BA335
IC327 M5233P
IC330 PD3031A
IC331 LC7800
IC332 TC5066BP

Q101~108,116,201~208
216,301,305,309,314
317, 320~323
2SC1740S

Q109,112,209,212
2SJ103
Q110,111,210,211
2SK246
Q117,217 2SC2060
Q302,303 2SC2060
Q304 2S3246
Q306,307,315,318,319
2SA9335

D323 RD3.0FB1
D306 1SR35-100A
D301~305, 307~322
324~330 1SS254

V101, 201, 303 :
VRTB6VS103
V102, 103, 202,203
VRTB6VS223
V301,302 :
VRTB6VS154

RY301 : RSR-035
S101,201 : RKN-092

L101,201 : RTF-138
L102,202 : RTF-155
L103,203 : RTF-152
L104,204 : RTF-126
L105,205 : RTF-153
L301 : RTD-038
X301 : RSS-035

R338 : RM7-223J
R339 : RCX-029
R346 : RCX-028

SWITCHES

MAIN UNIT

S101 : INPUT SELECTOR L LINE — MIC
(MIC JACK SWITCH)
S201 : INPUT SELECTOR R LINE — MIC

SWITCH UNIT

S501 : dbx OFF — ON
S502 : DOLBY NR B OFF — ON
S503 : DOLBY NR C OFF — ON
S504 : TIMER PLAY — OFF — REC
S505 : REVERSE MODE ⇄ — ⟲

OPERATION SWITCH UNIT

S701 : REW / 1 N.O. (NORMAL OFF)
S702 : FF / 2 N.O.
S703 : STOP/3 N.O.
S704 : REV-PLAY/4 N.O.
S705 : FWD-PLAY N.O.
S706 : MS− /6 N.O.
S707 : MS+ /7 N.O.
S708 : PAUSE /8 N.O.
S709 : REC / 9 N.O.
S710 : REC MUTE / 10 N.O.
S711 : PROGRAM / CLEAR N.O.
S712 : SIDE B N.O.
S713 : START N.O.
S714 : RESET N.O.
S715 : SKIP N.O.

POWER SWITCH UNIT

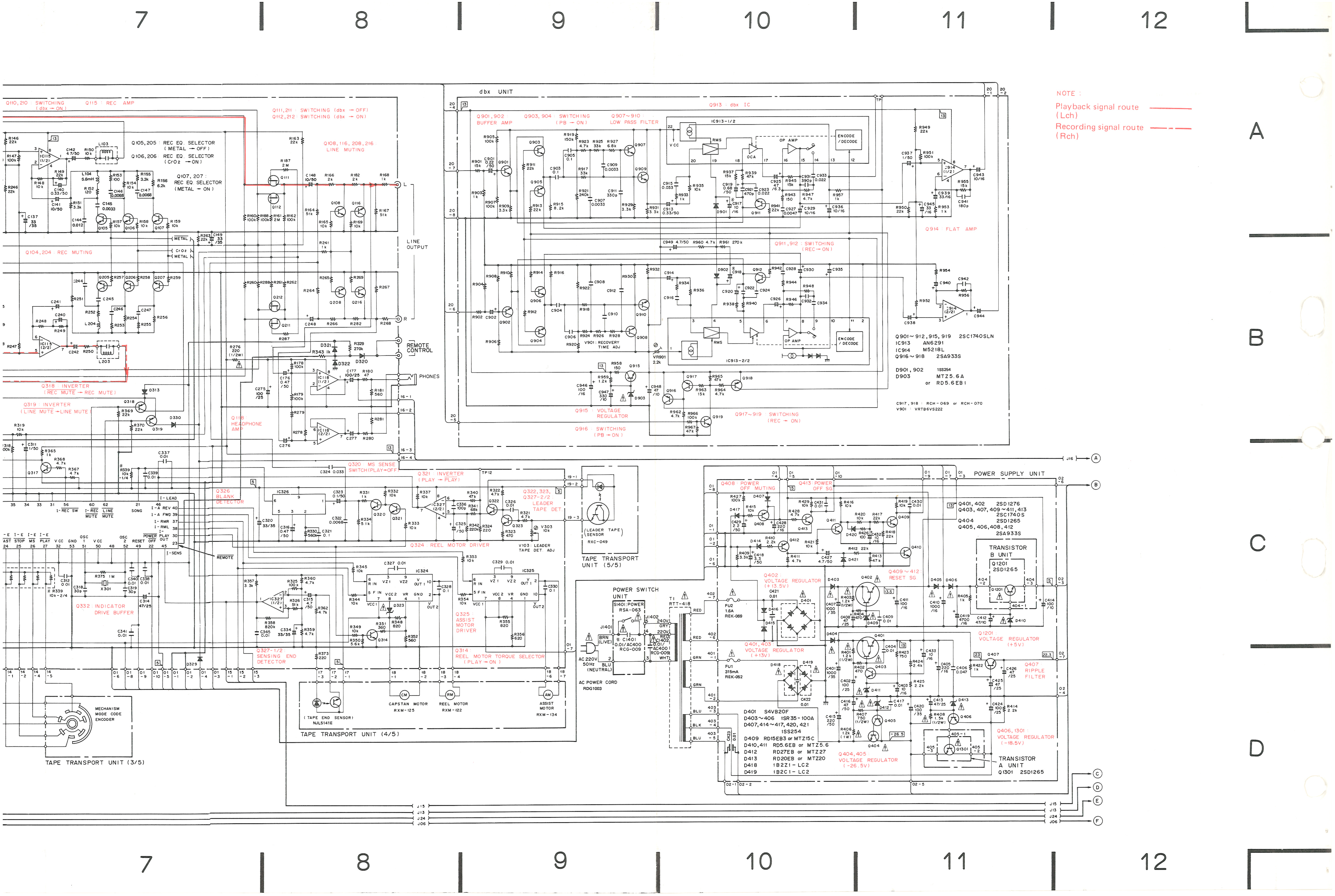
S1401 : POWER OFF — ON

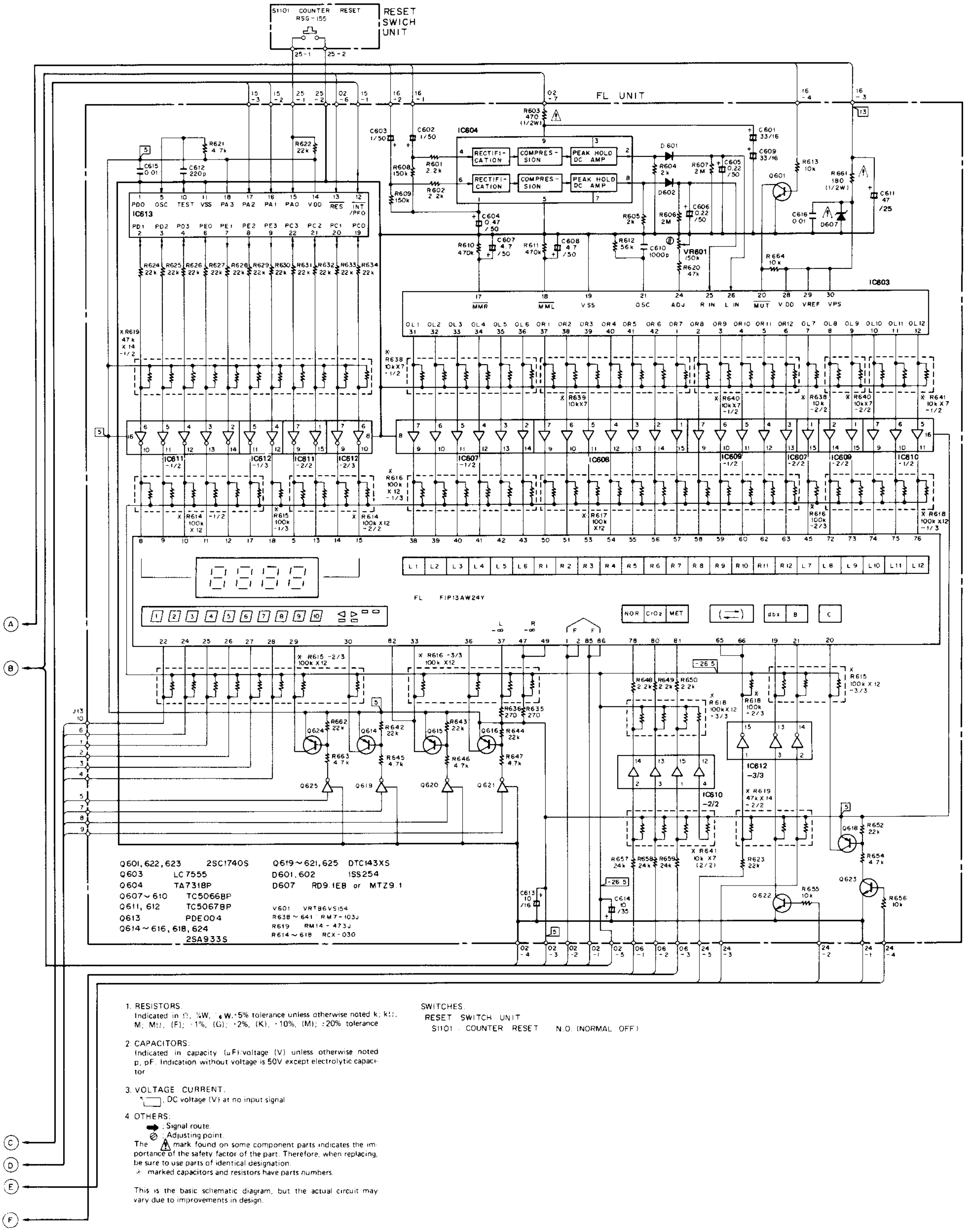
TAPE TRANSPORT UNIT

S1501 : ERASE PREVENT DETECTOR (REV)
OFF (HOLE) — ON (NON HOLE)
S1502 : CASSETTE DOOR
OFF (CLOSE) — ON (OPEN)
S1503 : ERASE PREVENT DETECTOR (FWD)
S1504 : METAL TAPE DETECTOR
S1505 : CrO2 TAPE DETECTOR

	NORM	CrO2	METAL
S1504	ON	ON	OFF
S1505	ON	OFF	OFF

The underlined indicates the switch position.


7
8
9
10
11
12
A
B
C
D
NOTE :
Playback signal route (Lch)
Recording signal route (Rch)
Q110, 210 : SWITCHING (dbx → ON)
Q115 : REC AMP
Q111, 211 : SWITCHING (dbx → OFF)
Q112, 212 : SWITCHING (dbx → ON)
Q105, 205 : REC EQ. SELECTOR (METAL → OFF)
Q106, 206 : REC EQ. SELECTOR (CrO2 → ON)
Q107, 207 : REC EQ. SELECTOR (METAL → ON)
Q108, 116, 208, 216 : LINE MUTING
Q104, 204 : REC MUTING
LINE OUTPUT
REMOTE CONTROL
PHONES
Q318 : INVERTER (REC MUTE → REC MUTE)
Q319 : INVERTER (LINE MUTE → LINE MUTE)
Q118 HEADPHONE AMP
Q320 : MS SENSE SWITCH (PLAY → OFF)
Q321 : INVERTER (PLAY → PLAY)
Q326 BLANK DETECTOR
Q322, 323, Q327-2/2 LEADER TAPE DET
Q324 : REEL MOTOR DRIVER
V103 : LEADER TAPE DET ADJ
Q332 : INDICATOR DRIVE BUFFER
Q327-1/2 SENSING END DETECTOR
Q325 ASSIST MOTOR DRIVER
Q314 : REEL MOTOR TORQUE SELECTOR (PLAY → ON)
REMOTE
CAPSTAN MOTOR RXM-125
REEL MOTOR RXM-122
ASSIST MOTOR RXM-134
(TAPE END SENSOR) NJL5141E
TAPE TRANSPORT UNIT (4/5)
MECHANISM MODE CODE ENCODER
TAPE TRANSPORT UNIT (3/5)
(LEADER TAPE) SENSOR RXC-049
TAPE TRANSPORT UNIT (5/5)
dbx UNIT
IC913 : dbx IC
Q901, 902 BUFFER AMP
Q903, 904 : SWITCHING (PB → ON)
Q907~910 LOW PASS FILTER
IC913-1/2
IC913-2/2
RMS
OCA
OP AMP
ENCODE / DECODE
VCC
V901 : RECOVERY TIME ADJ
Q911, 912 : SWITCHING (REC → ON)
Q914 : FLAT AMP
Q915 : VOLTAGE REGULATOR
Q916 : SWITCHING (PB → ON)
Q917~919 : SWITCHING (REC → ON)
Q901~912, 915, 919 2SC1740SLN
IC913 AN6291
IC914 M5218L
Q916~918 2SA933S
D901, 902 1SS254
D903 MTZ5.6A or RD5.6EB1
C917, 918 : RCH-069 or RCH-070
V901 : VRTB6VS222
POWER SUPPLY UNIT
Q408 : POWER OFF MUTING
Q413 : POWER OFF SG
Q409~412 : RESET SG
Q401, 402 2SD1276
Q403, 407, 409~411, 413 2SC1740S
Q404 2SD1265
Q405, 406, 408, 412 2SA933S
TRANSISTOR B UNIT
Q1201 2SD1265
Q402 : VOLTAGE REGULATOR (+13.5V)
Q401, 403 : VOLTAGE REGULATOR (+13V)
Q1201 : VOLTAGE REGULATOR (+5V)
Q407 : RIPPLE FILTER
Q406, 1301 : VOLTAGE REGULATOR (-18.5V)
Q404, 405 : VOLTAGE REGULATOR (-26.5V)
TRANSISTOR A UNIT
Q1301 2SD1265
D401 S4VB20F
D403~406 1SR35-100A
D407, 414~417, 420, 421 1SS254
D409 RD15EB3 or MTZ15C
D410, 411 RD5.6EB or MTZ5.6
D412 RD27EB or MTZ27
D413 RD20EB or MTZ20
D418 1B2Z1-LC2
D419 1B2C1-LC2
POWER SWITCH UNIT
S1401 : POWER RSA-063
C1401 0.01/AC400 RCG-009
C1402 0.01/AC400 RCG-009
T1 RTT-418
FU2 1.6A REK-069
FU1 315mA REK-052
AC 220V 50Hz
AC POWER CORD RDG1003
J16
J15
J13
J24
J06


S1101 COUNTER RESET RSG-155
RESET SWICH UNIT
FL UNIT
IC604
RECTIFI-CATION
COMPRES-SION
PEAK HOLD DC AMP
IC613
PDO OSC TEST VSS PA3 PA2 PA1 PA0 VDD RES INT/PFO
PD1 PD2 PD3 PE0 PE1 PE2 PE3 PC3 PC2 PC1 PC0
IC603
MMR MML VSS OSC ADJ R IN L IN MUT VDD VREF VPS
OL1 OL2 OL3 OL4 OL5 OL6 OR1 OR2 OR3 OR4 OR5 OR6 OR7 OR8 OR9 OR10 OR11 OR12 OL7 OL8 OL9 OL10 OL11 OL12
IC611 IC612 IC607 IC608 IC609 IC610
FL FIP13AW24Y
L1 L2 L3 L4 L5 L6 R1 R2 R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 L7 L8 L9 L10 L11 L12
NOR CrO2 MET
dbx B C
Q601 Q614 Q615 Q616 Q618 Q619 Q620 Q621 Q622 Q623 Q624 Q625
VR601
D601 D602 D607
J13
A B C D E F

Q601, 622, 623	2SC1740S	Q619 ~ 621, 625	DTC143XS
Q603	LC7555	D601, 602	1SS254
Q604	TA7318P	D607	RD9.1EB or MTZ9.1
Q607 ~ 610	TC5066BP		
Q611, 612	TC5067BP	V601	VRTB6VS154
Q613	PDE004	R638 ~ 641	RM7-103J
Q614 ~ 616, 618, 624	2SA933S	R619	RM14-473J
		R614 ~ 618	RCX-030

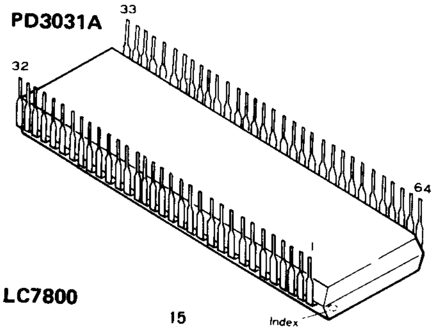
1. RESISTORS.
   Indicated in Ω, ¼W, 1/6W, ±5% tolerance unless otherwise noted k; kΩ, M; MΩ, (F); ±1%, (G); ±2%, (K); ±10%, (M); ±20% tolerance
2. CAPACITORS:
   Indicated in capacity (μF)/voltage (V) unless otherwise noted p, pF. Indication without voltage is 50V except electrolytic capacitor
3. VOLTAGE CURRENT.
   ▭ : DC voltage (V) at no input signal
4. OTHERS:
   ➡ : Signal route.
   ⊘ : Adjusting point.
   The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
   ☆ marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

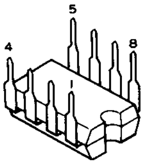
SWITCHES.
RESET SWITCH UNIT
S1101 : COUNTER RESET N.O. (NORMAL OFF)

External Appearance of Transistors and ICs

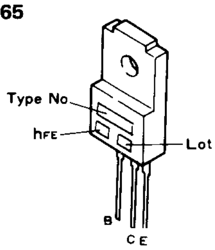
PD3031A


33
32
64
1
Index

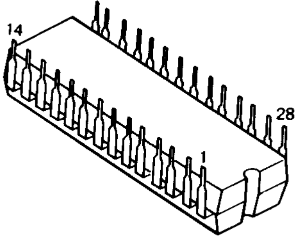
M5233P



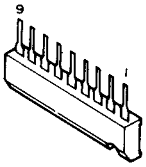
2SD1276
2SD1265


Type No
hFE
Lot
B
C E

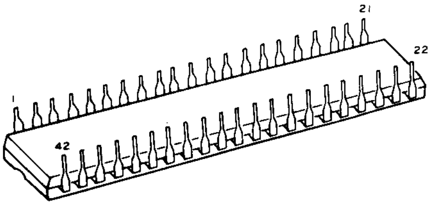
LC7800



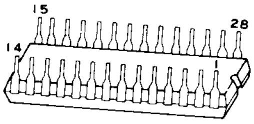
BA335



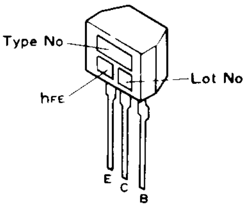
LC7555



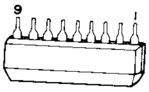
AN7370K



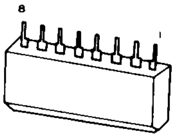
2SC1740S
2SA933S
2SC1740SLN


Type No
Lot No
hFE
E
C
B

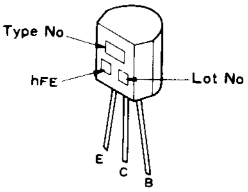
TA7318P



M5220L
M5218L



2SC2060


Type No
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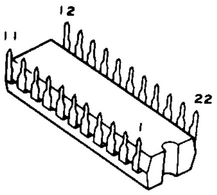
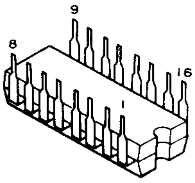
Lot No
E
C
B

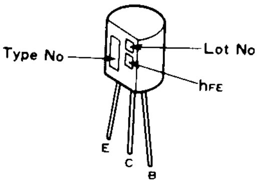
PDE004



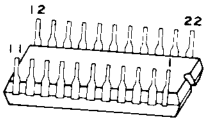
TC5066BP
TC5067BP



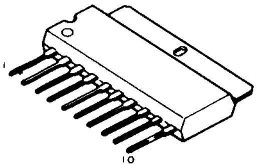
2SC2240


Type No
Lot No
hFE
E
C
B

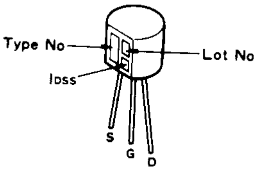
AN6291



BA6109



2SK246
2SJ103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Lot No
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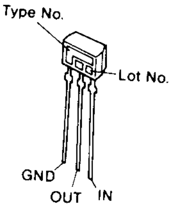
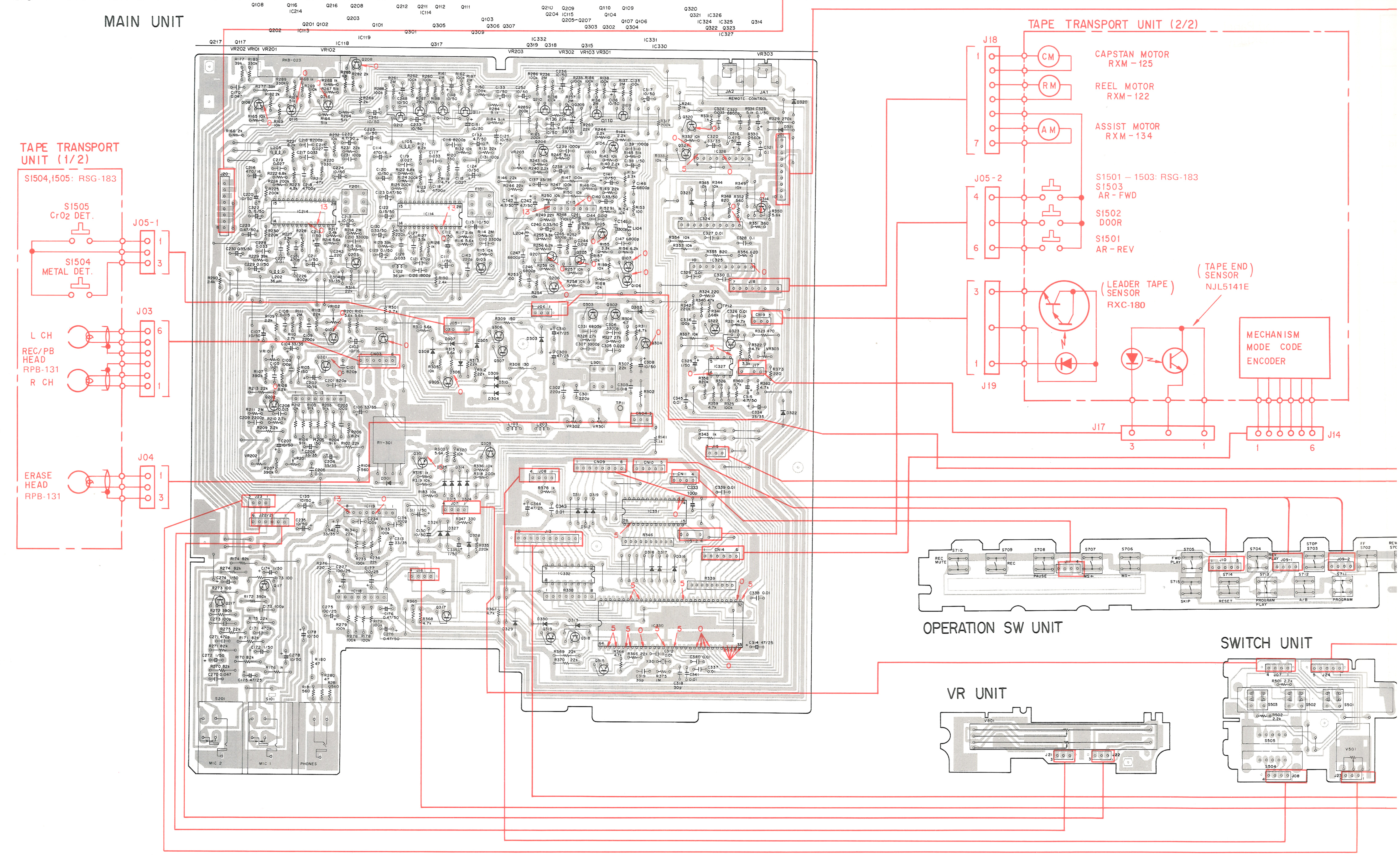
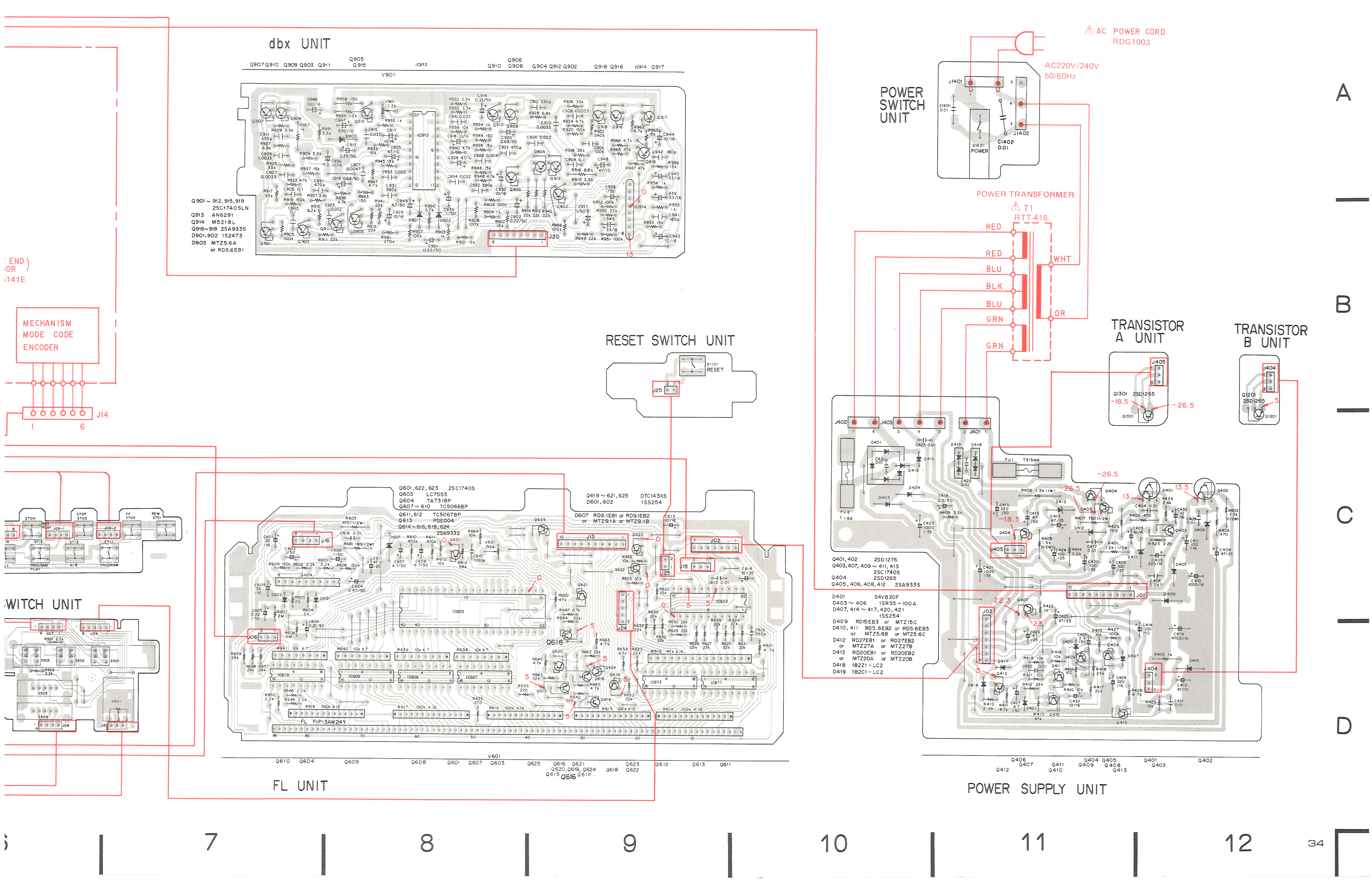
S
G
D

DTC143XS


Type No.
Lot No.
GND
OUT
IN

8. P.C.BOARDS CONNECTION DIAGRAM


MAIN UNIT
TAPE TRANSPORT UNIT (1/2)
S1504,1505: RSG-183
S1505 CrO2 DET.
S1504 METAL DET.
J05-1
J03
L CH
REC/PB HEAD RPB-131
R CH
J04
ERASE HEAD RPB-131
TAPE TRANSPORT UNIT (2/2)
J18
CAPSTAN MOTOR RXM-125
REEL MOTOR RXM-122
ASSIST MOTOR RXM-134
CM
RM
AM
J05-2
S1501 - 1503: RSG-183
S1503 AR-FWD
S1502 DOOR
S1501 AR-REV
(TAPE END SENSOR) NJL5141E
(LEADER TAPE SENSOR) RXC-180
J19
MECHANISM MODE CODE ENCODER
J17
J14
OPERATION SW UNIT
SWITCH UNIT
VR UNIT
MIC 2
MIC 1
PHONES
RY-301
REMOTE CONTROL

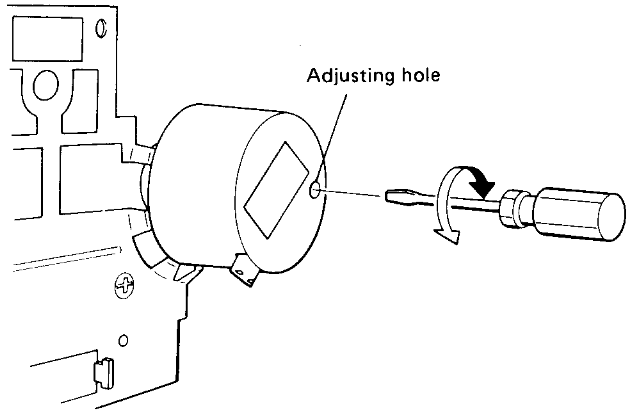

dbx UNIT
Q907 Q910 Q909 Q903 Q911 Q905 Q915 IC913 Q910 Q906 Q908 Q904 Q912 Q902 Q918 Q916 IC914 Q917
V901
Q901 ~ 912, 915, 919
2SC1740SLN
Q913 AN6291
Q914 M5218L
Q916~918 2SA933S
D901,902 1S2473
D903 MTZ5.6A
or RD5.6EB1
J20
MECHANISM MODE CODE ENCODER
J14
RESET SWITCH UNIT
S1101 RESET
J25
POWER SWITCH UNIT
J1401
J1402
C1401 0.01
C1402 0.01
S1401 POWER
AC POWER CORD
RDG1003
AC220V/240V
50/60Hz
POWER TRANSFORMER
T1
RTT418
RED
RED
BLU
BLK
BLU
GRN
GRN
WHT
OR
TRANSISTOR A UNIT
J405
Q1301 2SD1265
-18.5
-26.5
TRANSISTOR B UNIT
J404
Q1201 2SD1265
Q601,622,623 2SC1740S
Q603 LC7555
Q604 TA7318P
Q607 ~ 610 TC5066BP
Q611,612 TC5067BP
Q613 PDE004
Q614 ~ 616, 618, 624
2SA933S
Q619 ~ 621,625 DTC143XS
D601,602 1SS254
D607 RD9.1EB1 or RD9.1EB2
or MTZ9.1A or MTZ9.1B
J16
J13
J02
J15
J24
J06
IC603
IC610 IC609 IC608 IC607 IC612 IC611
FL FIP13AW24Y
V601
Q610 Q604 Q609 Q608 Q601 Q607 Q603 Q625 Q616 Q621 Q620,Q619,Q624 Q615 Q616 Q614 Q618 Q623 Q622 Q612 Q613 Q611
FL UNIT
WITCH UNIT
J07 J24 J08 J23
S501 S502 S503 S504 S505 V501
S701 S702 S703 S704 S711 S712 S713
J402 J403 J401
FU1 T315mA
FU2 T1.6A
Q401,402 2SD1276
Q403,407,409 ~ 411, 413
2SC1740S
Q404 2SD1265
Q405, 406, 408, 412 2SA933S
D401 S4VB20F
D403 ~ 406 1SR35 - 100A
D407, 414 ~ 417, 420, 421
1SS254
D409 RD15EB3 or MTZ15C
D410, 411 RD5.6EB2 or RD5.6EB3
or MTZ5.6B or MTZ5.6C
D412 RD27EB1 or RD27EB2
or MTZ27A or MTZ27B
D413 RD20EB1 or RD20EB2
or MTZ20A or MTZ20B
D418 1B2Z1 - LC2
D419 1B2C1 - LC2
J405 J01 J02 J404
-26.5
-26.5
-18.5
13
13.5
22.3
23
Q406 Q407 Q412 Q411 Q410 Q404 Q409 Q405 Q408 Q413 Q401 Q403 Q402
POWER SUPPLY UNIT
7 8 9 10 11
7 8 9 10 11 12
A B C D

9. ADJUSTMENTS

9.1 MECHANICAL ADJUSTMENT

1. Tape Speed Adjustment Check

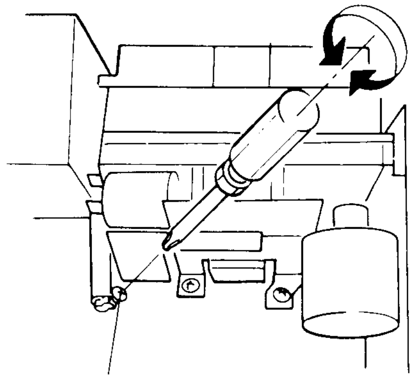
Mode	Test tape	Adjustment position	Rating (playback frequency)
PLAY	STD-301 (3kHz)	Variable Resistor control	3010Hz ± 5Hz


Adjusting hole

2. Door Damping Check And Adjustment

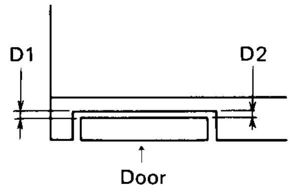
Adjustment position	Specifications
Cylinder adjustment screw If door bounces back : turn clockwise If door opens in two stpes : turn counter clockwise	Open the door (eject operation) but with no cassettes loaded. The door should open smoothly in a single action without bouncing back at the fully open position.

<Reference> Door opening speed: 0.8 sec. ±0.3 sec. (normal temperature)


Adjustment screw

3. Door Position Check And Adjustment

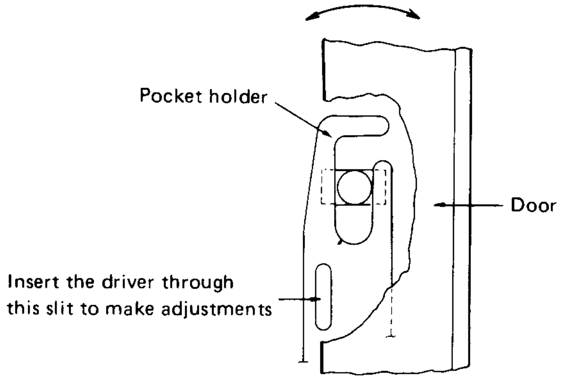
- The door position dimensions when viewed from above must conform with the following specifications.



<D dimensions>

Standard value	1.2 mm
Permissible values	0.9 thru 1.6 mm
Difference between left and right	ID1 – D2I < 0.4 mm

- If the above ratings are not satisfied, adjust bending the pocket holder as shown below.


Pocket holder
Door
Insert the driver through this slit to make adjustments

4. Tape Transport Adjustment

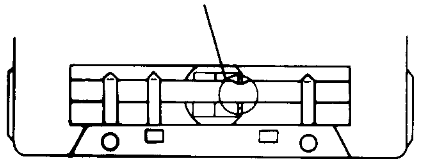
(remove cassette door)

Mode	Adjustment location	Specifications
FWD STOP	FWD azimuth screw	The head must be parallel with the tape transport direction when viewed from above with the door frame open.
REV STOP	REV azimuth screw	

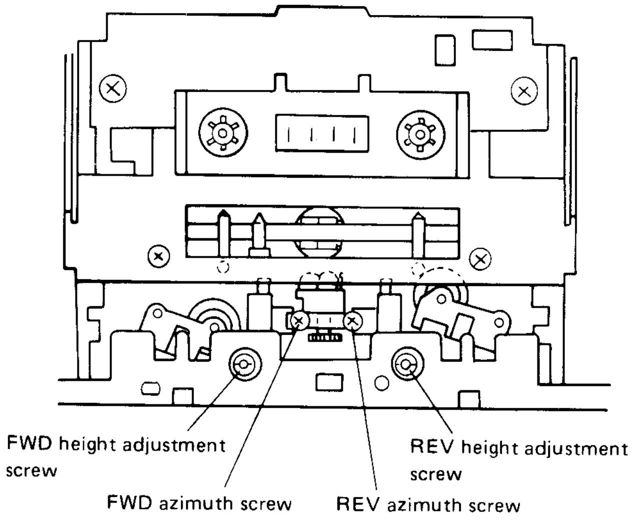
Load a mirror-equipped cassette half, and lift the head base by hand to bring the tape into contact with the tape guide.

Mode	Adjustment location	Specifications
STOP	Height adjustment screws (both left and right)	Tape should pass through through the center of the tape guide (rough visual adjustment).
FWD PLAY	Left height adjustment screw	Adjust the "upstream" tape guide so that tape does not curl at the guide.
REV PLAY	Right height adjustment screw.	

Eliminate curling at the head guide.

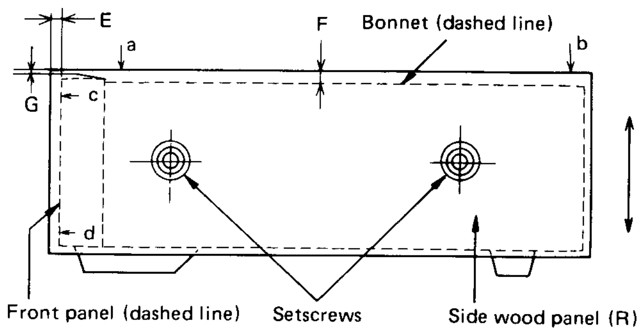


Mirror equipped cassette half.


FWD height adjustment screw
REV height adjustment screw
FWD azimuth screw
REV azimuth screw

5. Side Wood Panel Position Check & Adjustment
(CT-3070R (BK)/D/G)

- Dimensions for the side wood panels as seen from the side must conform with the following specifications.


E
F
Bonnet (dashed line)
a
b
G
c
d
Front panel (dashed line)
Setscrews
Side wood panel (R)

E dimensions	1±0.5 mm
Inclination (section c and d)	|Ec – Ed| < 0.5 mm
F dimension	
Inclination (sections a and b)	|Fa – Fb| < 0.5 mm
G dimension	0 – 2 mm (L – R difference < 1 mm)

- If the above dimension limits are not satisfied, loosen the two setscrews and shift the panel up/down left/right by appropriate amounts before retightening the screws.
- The left hand panel is adjusted in the same way.

6. Playback Mode Eject Check

- The tape deck should not stop when be EJECT button is pressed (taking up the slackness in the thrust direction) during playback mode.
- The tape deck should not stop when the set is dropped from a height of 5 cm with the front panel, and then the two sides facing down.

9.2 ELECTRICAL ADJUSTMENTS

Pre-requisities for Electrical Adjustments

1. All mechanical adjustments must have been completed.
2. The heads must be cleaned and demagnetized.
3. Let the set warm up for several minutes before starting.
4. Set signal level to 0dBv=1Vrms.
5. Connect a 50 kohm (47 to 52 kohms permissible) load resistance across the output terminals.
6. Leave all DOLBY NR and dbx switches off unless specified otherwise.

Test Tapes

Playback system adjustments	STD-331B (see Fig. 9-1)
NORMAL blank tape	STD-608A
CrO2 blank tape	STD-620
METAL blank tape	STD-610

List of Adjustments

1. Head azimuth adjustment
2. Playback equalizer adjustment
3. Playback level adjustment
4. Leader tape detection operation adjustment
5. Level Meter adjustment
6. Recording and playback frequency response adjustment
7. Recording level adjustment
8. dbx system recovery time adjustment

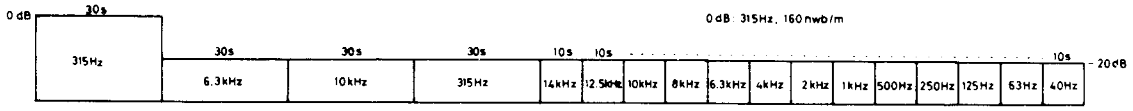

0 dB
30s
315Hz
30s
6.3kHz
30s
10kHz
30s
315Hz
10s
14kHz
10s
12.5kHz
10kHz
8kHz
6.3kHz
4kHz
2kHz
1kHz
500Hz
250Hz
125Hz
63Hz
10s
40Hz
0 dB: 315Hz, 160 nwb/m
– 20dB

Fig. 9-1 STD-331B test tape

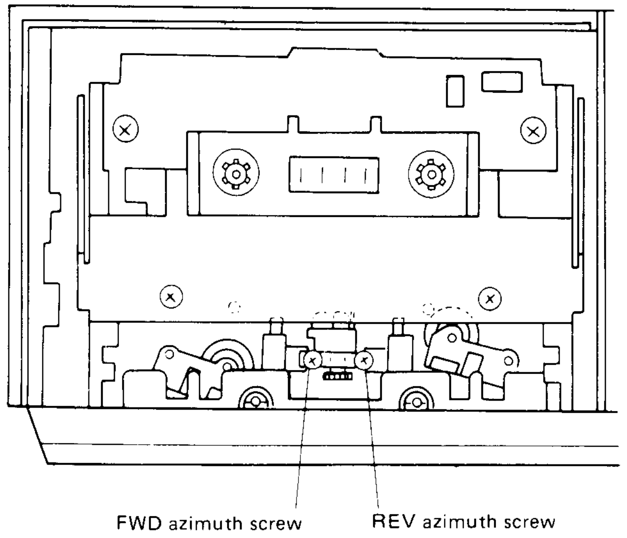

FWD azimuth screw
REV azimuth screw

Fig. 9-2 Head azimuth adjustment

Test tape	STD-331B
DOLBY NR switch	OFF

- Right channel is compensated by -0.5dB at 125Hz and by -1dB at 63Hz because of the edge effect.

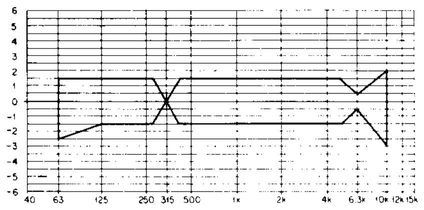


Fig. 9-3 Playback frequency response permissible zone

1. Head azimuth adjustment

- Adjust VR102 and VR202 to maximum positions, and VR101 and VR201 to mechanical center positions.

	Mode	Input signal & test tape	Adjustment position	Measuring position	Adjustment value	Remarks
1	FWD-PLAY	Play the 10kHz/–20dB portion of the STD-331B test	FWD azimuth screw (Fig. 9-2)	Left and right line output terminals	Maximum playback signal level	
2	REV-PLAY		REV azimuth screw (Fig. 9-2)			

2. Playback equalizer adjustment

	Mode	Input signal & test tape	Adjustment position	Measuring position	Adjustment value	Remarks
1	FWD-PLAY	Play the 315Hz and 6.3kHz/–20dB portion of the STD-331B test tape	VR101 (L ch) VR201 (R ch)	Left and right line output terminals	Adjust the 6.3kHz level to 0dB in respect to the 315Hz playback level	±0.5dB variation permissible
2	FWD/REV PLAY	Play various frequencies at –20dB on the STD-331B test tape	Check		The results must lie in the zone shown in Fig. 9-3.	

3. Playback level adjustment

- Execute this adjustment carefully since the result is used in setting the Dolby NR level.

	Mode	Input & test tape	Adjustment position	Measuring position	Adjustment value	Remarks
	FWD-PLAY	Play the 315Hz/0dB portion of the STD-331B test tape	VR102 (L ch)	TP (DOL.L) (*)	–17.9dBv (127.3mV)	
			VR202 (R ch)	TP (DOL.R)(*)		

* DOL.L is the left hand lead wire at R116, and DOL.R is the left hand lead wire at R216.

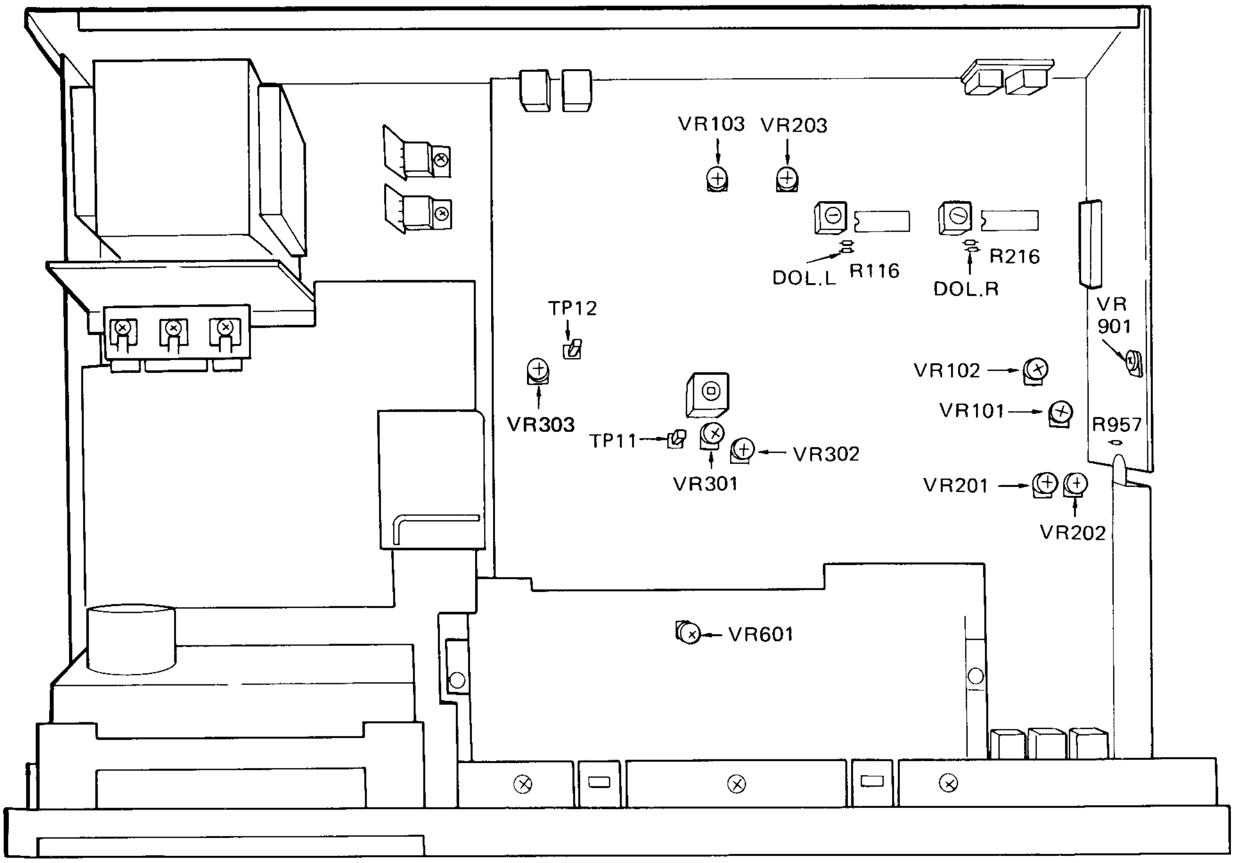


Fig. 9-4 Adjustment locations

4. Leader tape detection operation adjustment

	Mode	Input signal & test tape	Adjustment position	Measuring position	Adjustment value	Remarks
1	PLAY	No input — load an empty cassette half.	VR303	TP12 (LEADER)	$1V^{+0.2}_{-0}V$	
2	• Check that the leader tape is correctly detected (in both FWD and REV directions when in endless reverse mode).					

5. Level meter adjustment

	Mode	Input signal & test tape	Adjustment position	Measuring position	Adjustment value	Remarks
1	REC/ PAUSE	Apply a 315Hz/−10dBv signal to the line input terminals, and load the STD-608A test tape	REC LEVEL controls	TP (DOL.L) TP (DOL.R)	−14.9dBv (180mV)	
2			VR601	Turn VR601 fully counterclockwise, and turn slowly clockwise and stop when the "+3VU" segments come on.		

6. Recording and playback frequency response adjustment

- Leave the DOLBY NR switch off.

	Mode	Input signal & test tape	Adjustment position	Measuring position	Adjustment value	Remarks
1	REC/ PAUSE	Apply a 315Hz−30dBv signal to the line input terminals and load the STD-608A test tape.	REC LEVEL controls	TP (DOL.L) TP (DOL.R)	−37.9dBv (12.7mV)	
2	FWD REC→ PLAY	Record and play 315Hz and 6.3kHz signals at an input level of −30dBv.	VR103 (L ch) VR203 (R ch)	Left and right line output terminals	Adjust through repeated record/ playback cycles to obtain a 6.3kHz playback level of +1.0dB in respect to the 315Hz signal.	Variations from +0.5dB to +1.5dB are permissible.
3	REC → PLAY	With an input level of −30dBv record and play signals from 63Hz to 12kHz).	Check		Specifications for FWD and REV, and DOLBY NR OFF and ON (types B and C) (see Fig. 9-5) must be satisfied (for both FWD and REV).	
4	If the specifications are not satisfied (including the following checks), readjust the 6.3kHz playback level to within −1.5dB and +2.5dB in respect to the 315Hz signal in step 2.					
5	Repeat the step 3 check using the STD-620 test tape. The specifications shown in Fig. 9-6 are to be satisfied.					
6	Repeat the step 3 check using the STD-610 test tape. The specifications shown in Fig. 9-7 are to be satisfied.					
7	After completing the adjustment, check the distortion and ensure against "under bias".					

7. Recording level adjustment

- Leave the DOLBY NR switch off.

	Mode	Input signal & test tape	Adjustment position	Measuring position	Adjustment value	Remarks
1	REC/ PAUSE	Apply a 315Hz/−10dBv signal to the line input terminals, and load the STD-608A test tape.	REC LEVEL controls	TP (DOL.L) TP (DOL.R)	−17.9dBv (127.4mV)	
2	REC → PLAY	Record and play the 315Hz/ −10dBv signal.	VR103 (L ch) VR203 (R ch)		Adjust through repeated record/ playback cycles until a playback signal level of −17.9dBv (127.4mV) is obtained.	
3	REC → PLAY	Record and play the 315Hz/ −10dBv signal on STD-620	Check		−17.9±1.5dBv	
4	REC → PLAY	Record and play the 315Hz/ −10dBv signal on STD-610.	Check		−17.9±1.5dBv	

8. dbx system recovery time adjustment

	Mode	Input signal & test tape	Adjustment position	Measuring position	Adjustment value	Remarks
	STOP	None	VR901	R957 terminals	DC15mV	

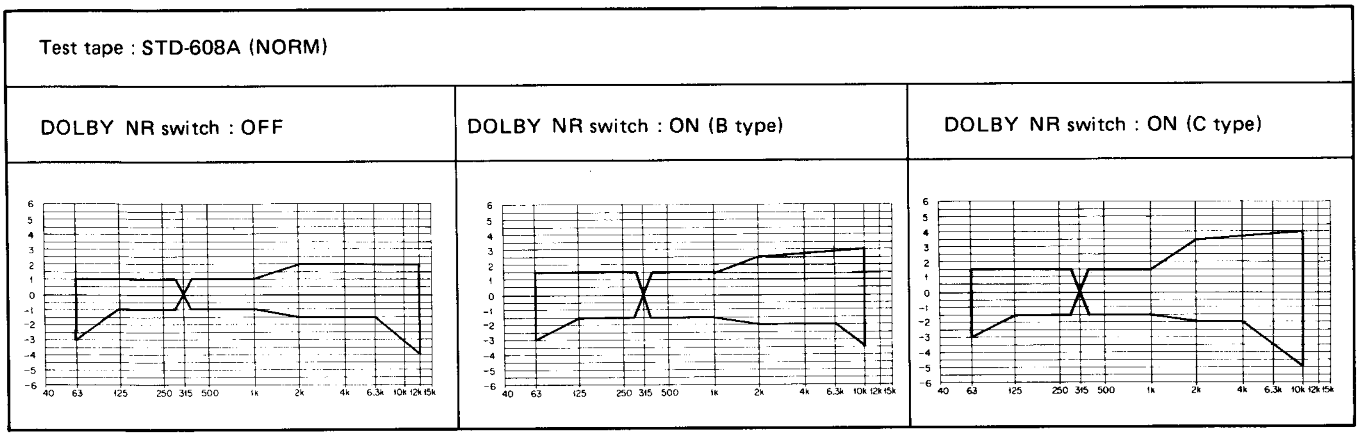


Fig. 9-5 Recording & playback frequency response tolerance zone (NORM)

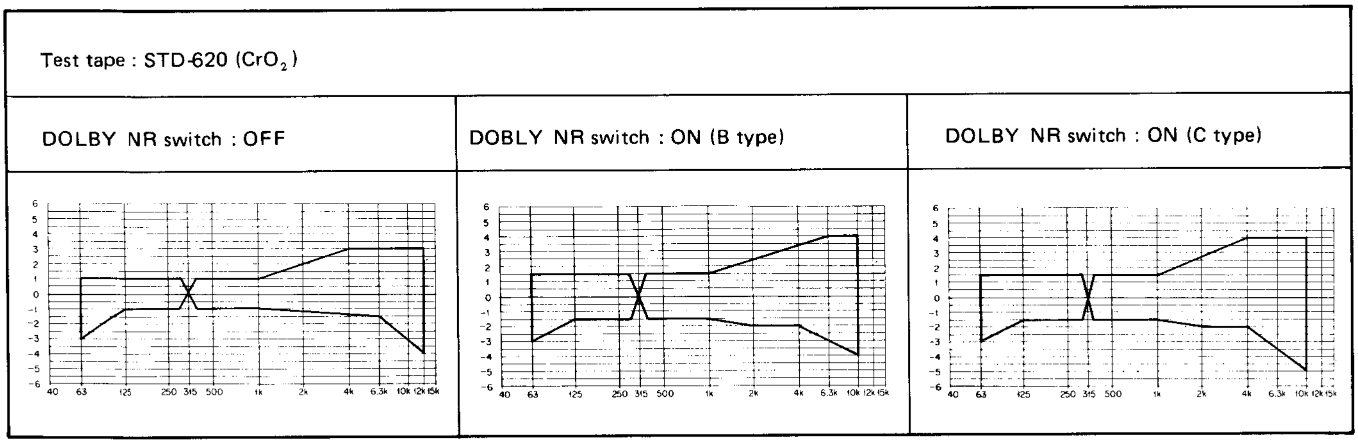


Fig. 9-6 Recording & playback frequency response tolerance zone (CrO$_2$)

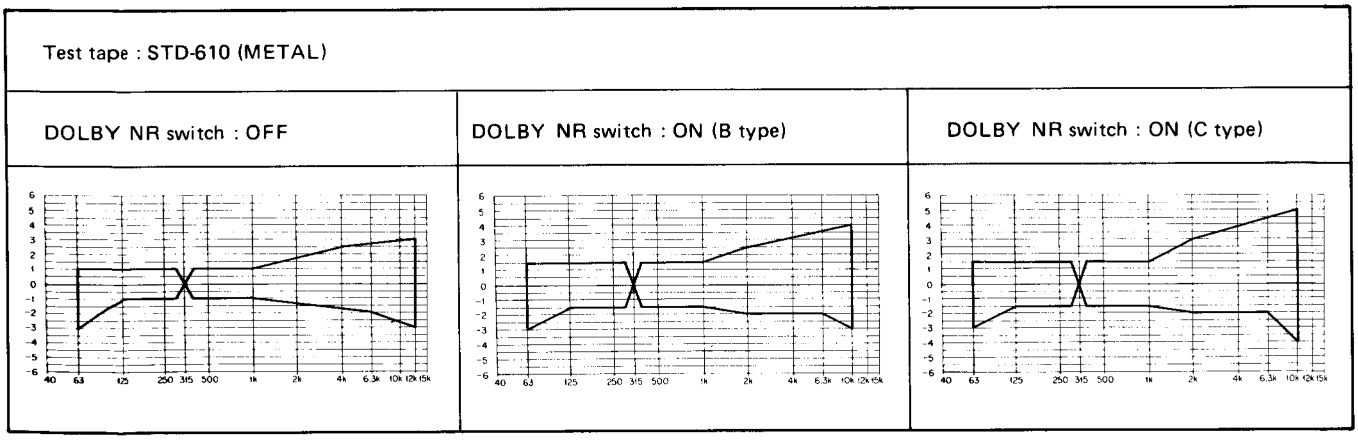
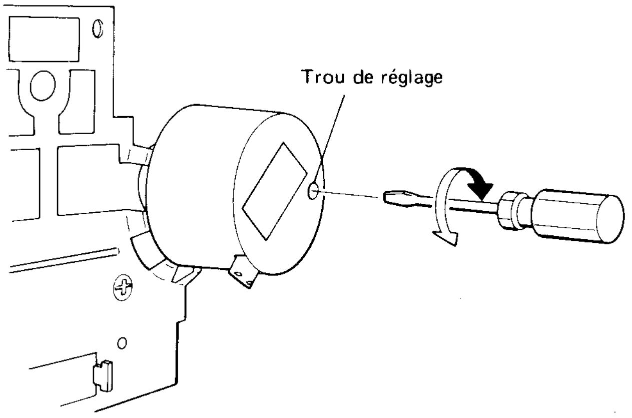


Fig. 9-7 Recording & playback frequency response tolerance zone (METAL)

9. RÉGLAGE

1. Contrôle du réglage de la vitesse de défilement

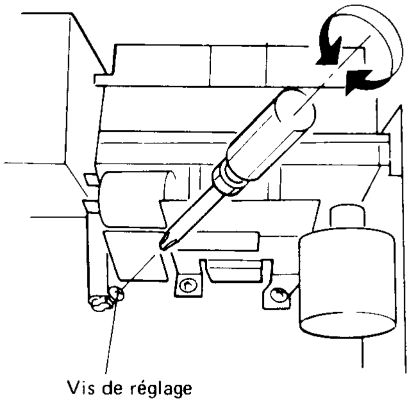
Mode	Bande d'étalonnage	Emplacement du réglage	Etalonnage caractéristique (fréquence de lecture)
LECTURE	STD-301 (3kHz)	Contrôle de résistance variable	3010Hz±5Hz



2. Contrôle et réglage d'amortissement de la trappe à cassette

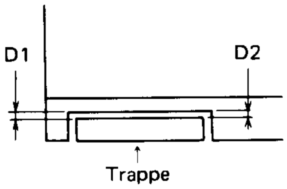
Emplacement du réglage	Caractéristiques
Vis de réglage de cylindre Si la trappe se dégage brutalement en arrière: tourner dans le sens des aiguilles d'une montre. Si la trappe se dégage en deux fois: tourner dans le sens contraire des aiguilles d'une montre.	Ouvrir la trappe à cassette (commande d'éjection), mais sans présence de cassette à l'intérieur. La trappe à cassette doit s'ouvrir progressivement, sans à-coups, sans se dégager brutalement en arrière et en deux temps, jusqu'à l'ouverture totale.

<Référence> Vitesse d'ouverture de la trappe à cassette: 0,8±0,3 sec. (à la température normale)



3. Contrôle et réglage de positionnnemente de trappe à cassette

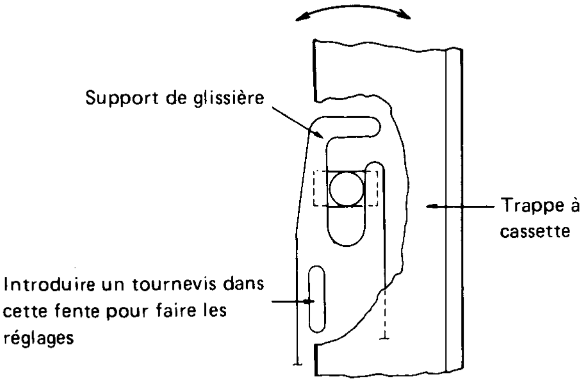
- Les dimensions de positionnement de la trappe sont conformes aux caractéristiques suivantes après inspection visuelle par dessus de la platine.



<D Dimensions>

Valeur nominale:	1,2 mm
Tolérances:	0,9 à 1,6 mm
Différences la gauche et la droite:	$\lvert D1 - D2 \rvert < 0,4$ mm

- Si les tolérances qui sont mentionnées ci-dessus ne sont pas satisfaites, ajuster en pliant le support de glissière de la valeur indiquée en procédant comme représenté sur le schéma ci-dessous.

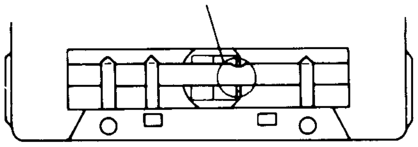

Support de glissière
Trappe à cassette
Introduire un tournevis dans cette fente pour faire les réglages

4. Réglage du système de transport de bande

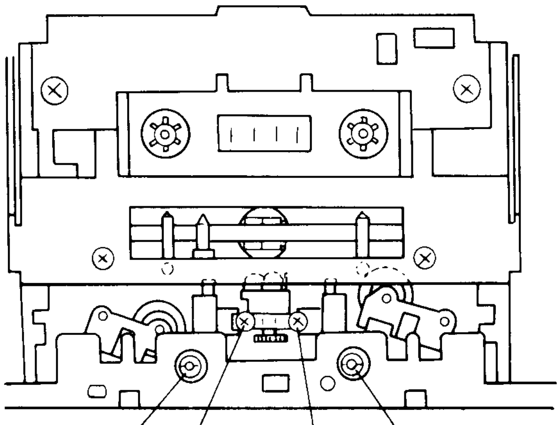
(retirer la trappes à cassette)

Mode	Emplacement du réglage	Caractéristiques
Arrêt en défilement normal	Vis de réglage d'azimut en défilement normal	Lorsque le montant de la trappe à cassette est ouvert, la tête doit être parallèle au sens de défilement de la bande lorsqu'elle est regardée par-dessus.
Arrêt en défilement inverse	Vis de réglage d'azimut en défilement inverse	
Charger un demi-boftier de cassette équipé d'un miroir et relever l'embase de la tête à la main pour que la bande touche le guide de bande.		
Arrêt	Vis de réglage de hauteur (gauche et droite)	Contrôler (visuellement) si la bande est positionnée à la hauteur de la section centrale du guide de bande.
Lecture en défilement normal	Vis de réglage de hauteur gauche	Ajuster la position du premier guide de bande pour être certain que la bande ne forme pas de plis au niveau du guide.
Lecture en défilement inverse	Vis de réglage de hauteur droite	

Aucune formation de plis ne doit se produire à la hauteur du guide de bande



Demi-boftier de cassette équipé d'un miroir



Vis de réglage de hauteur en défilement normal

Vise de réglage d'azimut en défilement normal

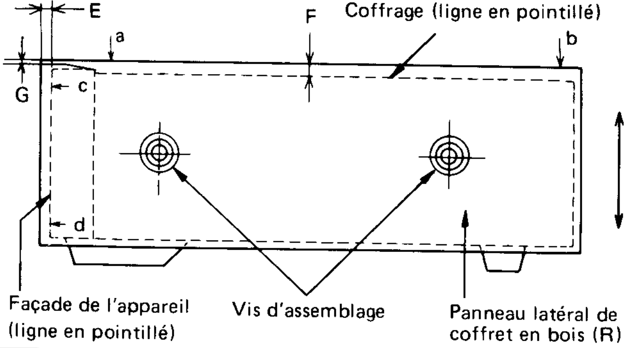
Vis de réglage de hauteur en défilement inverse

Vis de réglage d'azimut en défilement inverse

5. Réglage et contrôle de position du panneau latéral de coffret en bois

(CT-3070R (BK)/D/G)

- Les dimensions des panneaux latéraux de coffret en bois vus de côté doivent être conforms aux caractéristiques suivantes.


E
F
Coffrage (ligne en pointillé)
a
b
G
c
d
Façade de l'appareil (ligne en pointillé)
Vis d'assemblage
Panneau latéral de coffret en bois (R)

Dimension E	1±0,5 mm
Inclinaison (sections c et d)	|Ec – Eb| < 0,5 mm
Dimension F	
Inclinaision (sections a et b)	|Fa – Fb| < 0,5 mm
Dimension G	0 à 2 mm (Différence L – R <1 mm)

- Si les dimensions mentionnées ci-dessus ne sont pas satisfaites, desserrer le deux vis d'assemblage et dcaler le panneau dans le sens vertical ou dans le sens horizontal de la valeur nécessaire et resserrer les vis.

- La position du panneau placé du côté gauche peut être ajustée de la même façon.

6. Contrôler d'éjection en mode de lecture

- La platine magnétophone ne doit pas s'arrêter quand la touche EJECT est pressée (rattrapage du manque de tension de la bande dans la direction de la poussée) au cours du mode de lecture.
- La platine magnétophone ne doit pas s'arrêter quand l'appareil est lâché d'une hauteur de 5 cm avec la façade dirigée vers le sol puis les côtés tour à tour dirigés vers le sol.

9.1 RÉGLAGES ÉLECTRIQUES

Conditions nécessaires pour effectuer les réglages électriques

1. Tous les réglages des mécanismes doivent avoir été préalablement réalisés.
2. Les têtes magnétiques doivent être propres et démagnétisées.
3. Laisser chauffer les platines pendant quelques minutes avant de commencer à faire les réglages électriques.
4. Caler le niveau du signal de référence à 0dBv= 1V effi.
5. Raccorder une résistance de charge de 50K-ohms entre les bornes de sortie de ligne (les charges se trouvant dans les limites de 47K à 52K-ohms sont tolérées).
6. A moins d'une indication contraire, tous les commutateurs DOLBY NR et dbx doivent se trouver en position OFF.

Bandes d'étalonnage

Réglages des systèmes de lecture: STD-331B (voir la Fig. 9-1)
Bande vierge ordinaire (NORMAL) : STD-608A
Bande vierge au chrome (CrO2) : STD-620
Bande vierge au fer (METAL) : STD-610

Liste des réglages à exécuter

1. Réglage d'azimut de tête magnétique
2. Rélage de l'égalisateur de lecture
3. Réglage du niveau de lecture
4. Réglage de détection de bande-amorce
5. Réglage de décibelmètre
6. Calage de réponse en fréquence d'enregistrement et de lecture
7. Réglage du niveau d'enregistrement
8. Réglage de durée de rétablissement du système dbx

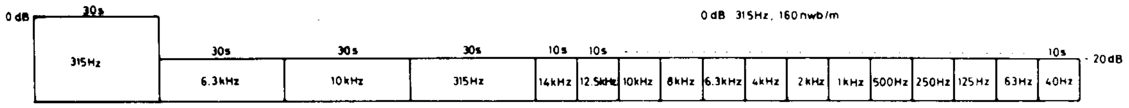
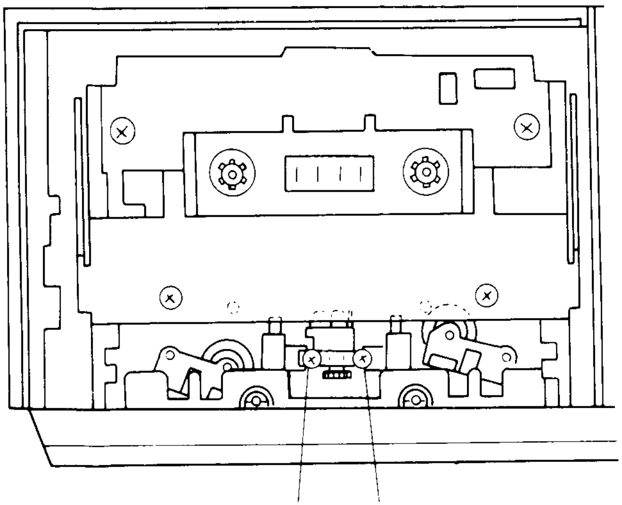


Fig. 9-1 Bande d'étalonnage STD-331B



Vis de réglage d'azimut en défilement normal

Vis de réglage d'azimut en défilement inverse

Fig. 9-2 Vis de réglage d'azimut de tête

Bande d'etalonnage	STD-331B
Position du commutateur DOLBY NR	OFF

- Le canal droit est compensé de –0,5dB à 125Hz et de –1dB à 63Hz suite à l'effet marginal.

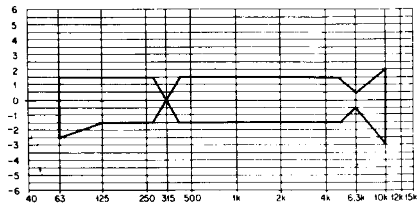


Fig. 9-3 Zone de tolérance de réponse en fréquence de lecture

1. Réglage d'azimut de tête magnétique

- Régler les résistances variables VR102 et VR202 de façon à obtenir des niveaux maximaux et les résistances variables VR101 et VR201 sur leur position mécanique centrale.

	Mode	Signal d'entrée appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne d'étalonnage	Valeur relevée	Observations
1	DÉFILEMENT NORMAL-LECTURE	Lire le passage préenregistré de 10kHz/−20dB de la bande d'étalonnage STD-331B	Vis de réglage d'azimut de tête d'avance normal (voir la figure 9-2)	Bornes de sortie de ligne droite et gauche	Niveau maximum du signal de lecture	
2	LECTURE-DÉFILEMENT INVERSE		Vis de réglage d'azimut de tête d'avance inverse (voir la figure 9-2)			

2. Réglage de l'égalisateur de lecture

	Mode	Signal d'entrée appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne d'étallonnage	Valeur relevée	Observations
1	DÉFILEMENT NORMAL-LECTURE	Lire le passage préenregistré de 315Hz et de 6,3kHz/−20dB de la bande d'étalonnage STD-331B	VR101 (canal gauche) VR201 (canal droit)	Bornes de sortie de ligne droite et gauche	Ajuster le niveau de lecture de 6,3kHz à 0dB par rapport au niveau de lecture de 315Hz	±0,5dB d'écart admissible
2	DÉFILEMENT NORMAL-DÉFILEMENT INVERSE LECTURE	Lire plusieur sections de fréquence préenregistrées −20dB de la bande d'étalonnage STD-331B	Confirmer		Les résultats doivent se placer dans la zone représentée sur la figure 9-3	

3. Réglage du niveau de lecture

- Ce réglage servant à étalonner le niveau du DOLBY NR doit être exécuté avec une grande précision.

	Mode	Signal d'entrée appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne d'étalonnage	Valeur relevée	Observations
1	DÉFILEMENT NORMAL-LECTURE	Lire le passage préenregistré de 315Hz/0dB de la bande d'étalonnage STD-331B	VR102 (canal gauche)	TP (DOL.L)(*)	−17,9dBv (127,3mV)	
			VR202 (canal droit)	TP (DOL.R)(*)		

* DOL.L est le fil de jonction gauche à R116 et DOL.R est le fil de jonction gauche à R216.

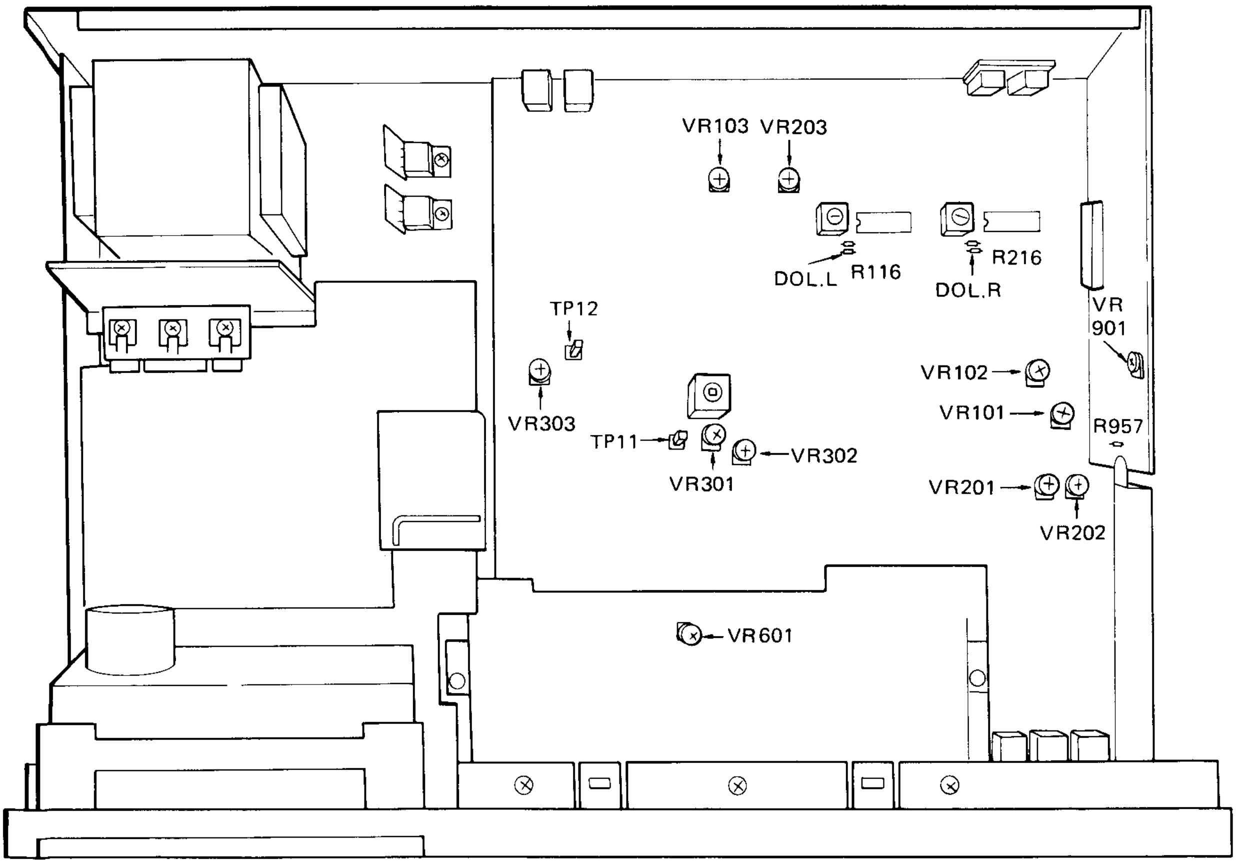


Fig. 9-4 Implantation des composants de réglage

4. Réglage de détection de bande-armorce

	Mode	Signal d'entrée appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne d'étalonnage	Valeur relevée	Observations
1	LECTURE	Aucun signal injecté; charger une demi-cassette vide	VR303	TP12 (BANDE-AMORCE)	$1V^{+0,2}_{-0}V$	
2	• S'assurer que la bande-amorce est correctement détectée (dans les deux sens: défilement normal et défilement inverse quand la platine est réglée en mode continu)					

5. Réglage des décibelmètres

	Mode	Signal d'entrée appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne d'étalonnage	Valeur relevée	Observations
1	PAUSE À L'ENREGISTREMENT	Appliquer un signal de 315Hz/ –10dBv aux bornes d'entrée de ligne et charger la bande d'etalonnage STD-608A	Potentiomètres de niveau d'enregistrement	TP (DOL.L) TP (DOL.R)	–14,9dBv (180mV)	
2			VR601	Tourner complètement VR601 dans le sens contraire des aiguilles d'une montre puis la tourner lentement dans le sens des aiguilles d'une montre et s'arrêter dès que les segments "+3VU" s'allument		

6. Réglage de réponse en fréquence de lecture et d'enregistrement

- Conserver le commutateur DOLBY NR en position OFF.

	Mode	Signal d'entrée applique et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne d'étalonnage	Valeur relevée	Observations
1	PAUSE À L'ENREGISTREMENT	Appliquer un signal de 315Hz/ –30dBv aux bornes d'entrée de ligne et charger la bande d'étalonnage STD-608A	Potentiomètres de niveau d'enregistrement	TP (DOL.L) TP (DOL.R)	–37,9dBv (12,7mV)	
2	DÉFILEMENT NORMAL – ENREGISTREMENT → LECTURE	Enregistrer et lire les signaux de 315Hz et 6,3kHz au niveau d'entrée de –30dBv	VR301 (canal G) VR302 (canal D)	Bornes de sortie de ligne gauche et droite	Obtenir un niveau de lecture de 6,3kHz et de +1dB par rapport au niveau du signal de 315Hz en effectuant des essais successifs d'enregistrement et de lecture	Les écarts admissibles sont de l'ordre de +0,5dB à +1,5dB
3	ENREGISTREMMENT → LECTURE	Enregistrer et lire les signaux de 63Hz à 12kHz avec un niveau d'entrée de +30dBv	Contrôler		Les caractéristiques des modes de défilement normal et de défilement inverse, quand le commutateur DOLBY NR est sur OFF et sur ON (types B et C) (voir la figure 9-5) doivent être satisfaites (pour les deux modes précités)	
4	Si les caractéristique ne sont pas satisfaites (y compris les contrôles qui suivent), refaire le réglage du niveau de lecture de 6,3kHz pour obtenir un résultat de plaçant dans les limites spécifiées de –1,5dB et +2,5dB par rapport au niveau du signal de 315Hz, comme indiqué à l'opération 2.					
5	Refaire le contrôle décrit dans l'opération 3 avec la bande d'étalonnage STD-620. Les caractéristiques indiquées par la figure 9-6 doivent être satisfaites.					
6	Refaire le contrôle décrit dans l'opération 3 avec la bande d'étalonnage STD-610. Les caractéristiques indiquées par la figure 9-7 doivent être satisfaites.					
7	Lorsque les réglages sont terminés, contrôler la distorsion et s'en assurer par rapport à la souspolarisation.					

7. Réglage du niveau d'enregistrement

- Conserver le commutateur DOLBY NR en position OFF.

	Mode	Signal d'entrée appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne d'étalonnage	Valeur relevée	Observations
1	PAUSE À L'ENREGISTREMENT	Injecter un signal de 315Hz/–10dBv par les bornes d'entrée de ligne et charger la bande d'étalonnage STD-608A	Potentiomètres de niveau d'enregistrement	TP (DOL.L) TP (DOL.R)	–17,9dBv (127,4mV)	
2	ENREGISTREMENT → LECTURE	Enregistrer et lire le signal de 315Hz au niveau d'entrée de –10dBv	VR103 (canal G) VR203 (canal D)		Obtenir un niveau de lecture de –17,9dBv (127,4mV) en effectuant des essais successifs d'enregistrement et de lecture	
3	ENREGISTREMENT → LECTURE	Enregistrer et lire le signal de 315Hz/–10dBv sur la bande d'étalonnage STD-620	Contrôler		–17,9±1,5dBv	
4	ENREGISTREMENT → LECTURE	Enregistrer et lire le signal de 315Hz/–10dBv sur la bande d'étalonnage STD-610	Contrôler		–17,9±1,5dBv	

8. Réglage de durée de recouvrement du système dbx

Mode	Signal d'entrée appliqué et bande d'étalonnage	Emplacement du réglage	Emplacement de la borne d'étalonnage	Valeur relevée	Observations
ARRÊT	Aucun signal	VR901	Bornes R957	DC15mV	

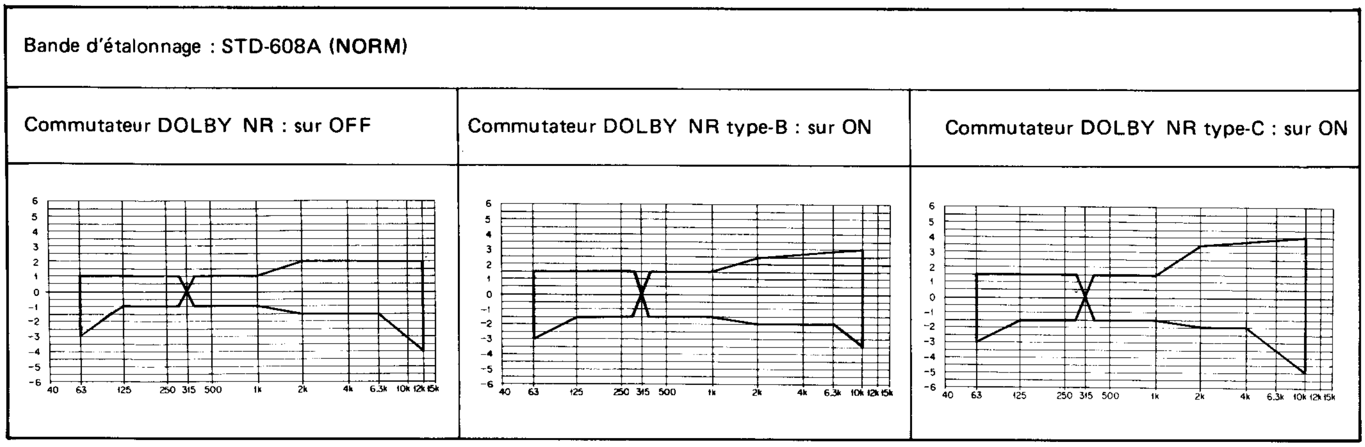


Fig. 9-5 Zones admissibles de réponse en fréquence d'enregistrement et de lecture (NORM)

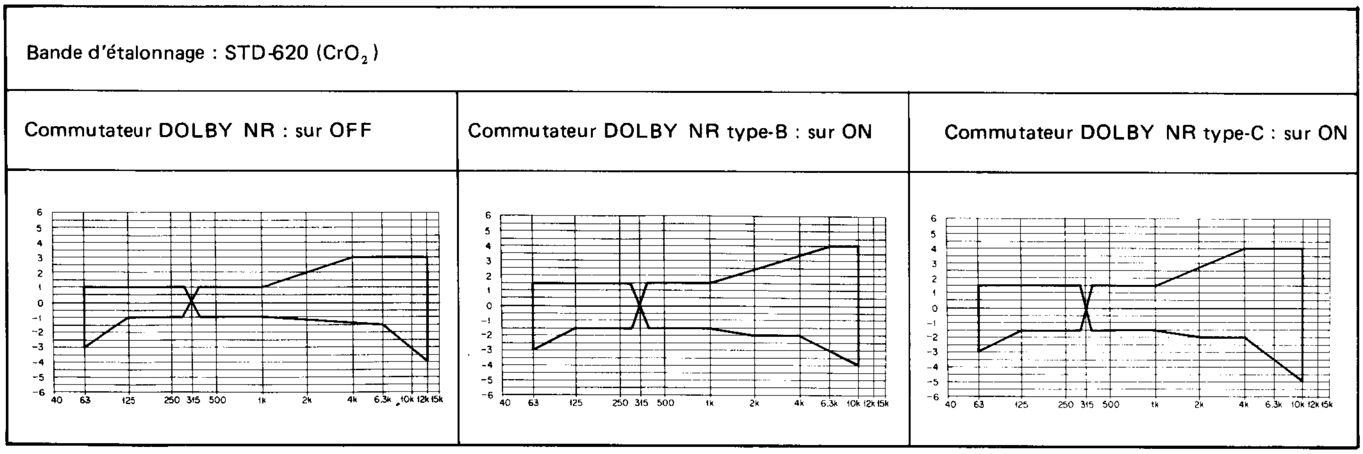


Fig. 9-6 Zones admissibles de réponse en fréquence d'enregistrement et de lecture (CrO_2)

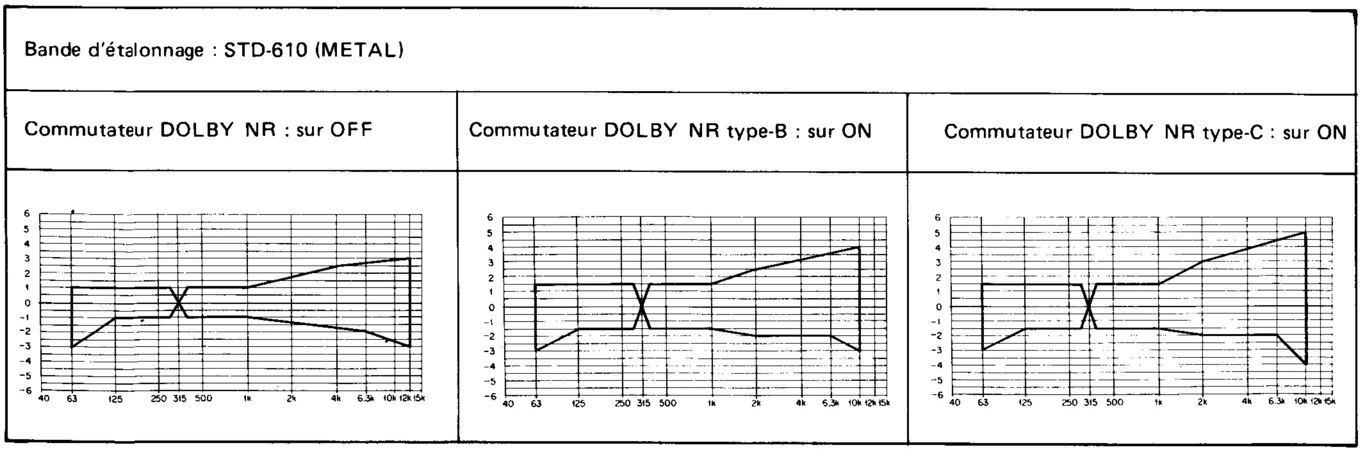
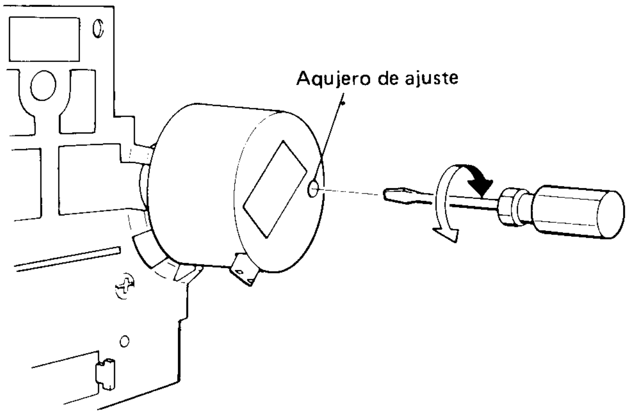


Fig. 9-7 Zones admissibles de réponse en fréquence d'enregistrement et de lecture (METAL)

9. AJUSTE

1. Inspección de ajuste de velocidad de la cinta

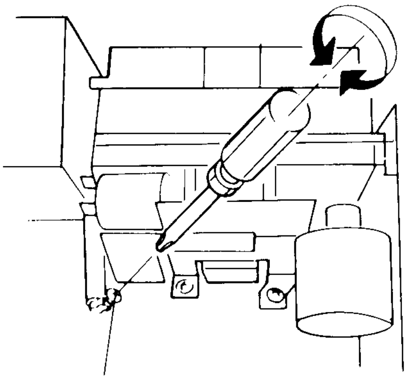
Modo	Cinta de prueba	Posición de ajuste	Capacidad (Frecuencia de reproducción)
PLAY	STD-301 (3kHz)	Control del resistor variable	3010Hz±5Hz



2. Inspección y ajuste de amortiguamiento de la puerta

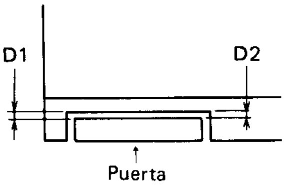
Posición de ajuste	Especificaciones
Tornillo de ajuste del cilindro Si la puerta rebota hacia atrás: girar a la derecha Si la puerta se abre en dos pasos: girar a la izquierda	Abra la puerta (operación de eyección) sin el cassette cargado. La puerta debe abrirse suavemente en una acción sin rebotar en la posición completamente abierta.

<Referencia> Velocidad de abertura de la puerta: 0,8 seg. ± 0,3 seg. (temperatura normal)



3. Inspección y ajuste de la posición de las puertas

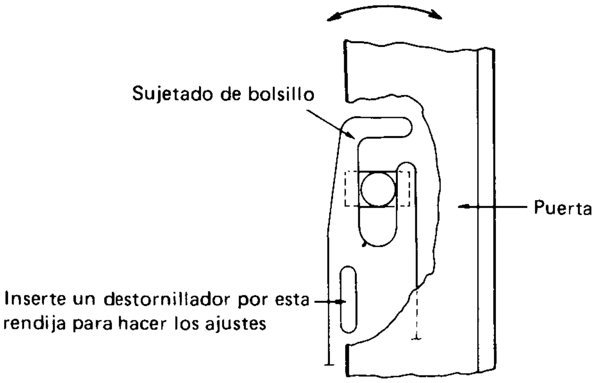
- Las dimensiones de la posición de las puertas vistas de arriba deben estar de acuerdo con las siguientes especificaciones.


D1
D2
Puerta

<Dimensiones D>

Valor estándar	1,2 mm
Valores permisibles	0,9 a 1,6 mm
Diferencia entre la derecha e izquierda	$|D1 - D2| < 0,4$ mm

- Si no están de acuerdo con los valores indicados, efectúe el ajuste doblando el sujetador de bolsillo como se muestra abajo.

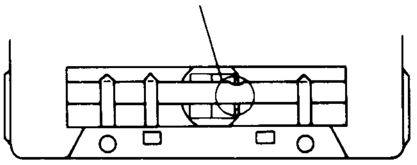

Sujetado de bolsillo
Puerta
Inserte un destornillador por esta rendija para hacer los ajustes

4. Ajuste de la dirección de marcha de la cinta

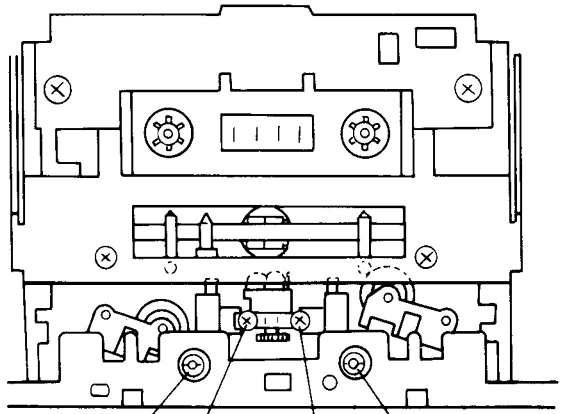
(Quite la puerta de cassette)

Modo	Posición de ajuste	Especificaciones
Parada de avance "FWD STOP"	Tornillo de ajuste azimultal de inversión FWD	El cabezal debe estar en paralelo con la dirección de marcha de la cinta vista de arriba con el marco de puerta abierto
Parada de inversión "REV STOP"	Tornillo de ajuste azimultal de inversión REV	
Coloque una mitad de cassette equipado con espejo, y levante la base del cabezal con la mano para poner la cinta en correcto contacto con la guía de cinta.		
Parada "STOP"	Tornillos de ajuste de altura (derecho e izquierdo)	La cinta debe pasar por el centro de la guía de cinta (ajuste visual)
Avance-reproducción "FWD PLAY"	Tornillo de ajuste de altura izquierdo	Ajuste la guía de cinta de "corriente arriba" de manera que la cinta no se encrespe en la guía
Inversión-reproducción "REV PLAY'	Tornillo de ajuste de altura derecho	

Elimine el encrespado en la guía cabezal

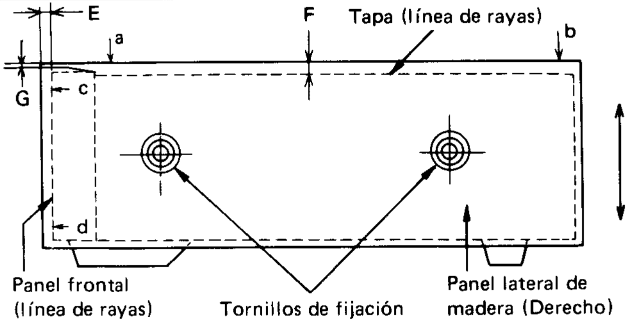


Mitad de cassette con espejo


Tornillo de ajuste de altura de avance "FWD"
Tornillo de ajuste azimutal "FWD"
Tornillo de ajuste azimutal "REV"
Tornillo de ajuste de altura de inversión "REV"

5. Inspección y ajuste de la posición de los paneles laterales de madera (CT-3070R (BK)/D/G)

- Las dimensiones de los paneles laterales de madera vistos de los costados deben estar de acuerdo con los valores dados abajo.


E
F
Tapa (línea de rayas)
a
b
G
c
d
Panel frontal
(línea de rayas)
Tornillos de fijación
Panel lateral de
madera (Derecho)

Dimensión E	1±0,5 mm
Inclinación (secciones c y d)	$\lvert Ec - Eb \rvert < 0{,}5$ mm
Dimensión F	
Inclinación (secciones a y b)	$\lvert Fa - Fb \rvert < 0{,}5$ mm
Dimensión G	0 – 2 mm (Diferencia en la derecha e izquierda (1 mm))

- Si no están de acuerdo con los valores especificados, afloje los dos tornillos de fijación y regule el panel hacia arriba/abajo/derecha/izquierda y reapriete los tornillos.

- El panel izquierdo se ajusta de la misma manera.

6. Inspección de la expulsión en el modo de reproducción

- El deck de cinta no debe pararse al presionar el botón de eyección "EJECT" (para quitar la laxitud en la dirección de empuje) durante el modo de reproducción.
- El deck de cinta no debe parar al caer de una altura de 5 cm con su panel delantero hacia abajo y luego ambos costados.

9.1 AJUSTES ELECTRICOS

Requisitos previos para los ajustes eléctricos

1. Todos los ajustes mecánicos deben estar terminados.
2. Los cabezales deben estar limpios y desimanados.
3. Deje que el aparato se caliente por varios minutos antes de iniciar los ajustes.
4. Regule el nivel de señal a 0dBv=1Vrms.
5. Conecte una resistencia de carga de 50 kilo-ohmios (47 a 52 kilo-ohmios permisibles) a través de los terminales de salida.
6. Deje todos los interruptores DOLBY NR y dbx en OFF a menos que se indique de otra manera.

Cintas de prueba

Ajustes del sistema de reproducción : STD-331B (Véase la Fig. 9-1)
Cinta en blanco NORMAL : STD-608A
Cinta en blanco CrO_2 : STD-620
Cinta en blanco METAL : STD-610

Lista de ajustes

1. Ajuste azimutal del cabezal
2. Ajuste del ecualizador de reproducción
3. Ajuste del nivel de reproducción
4. Ajuste de la operación de detección de punta de la cinta
5. Ajuste del indicador de nivel
6. Ajuste de respuesta de frecuencia de grabación y reproducción
7. Ajuste del nivel de grabación
8. Ajuste del tiempo de recuperación del sistema dbx

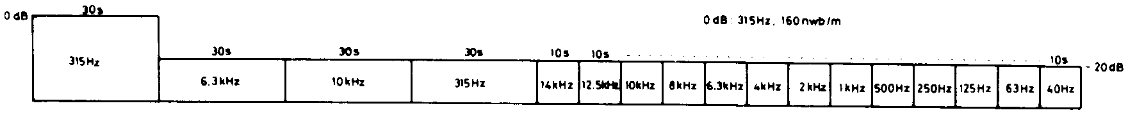
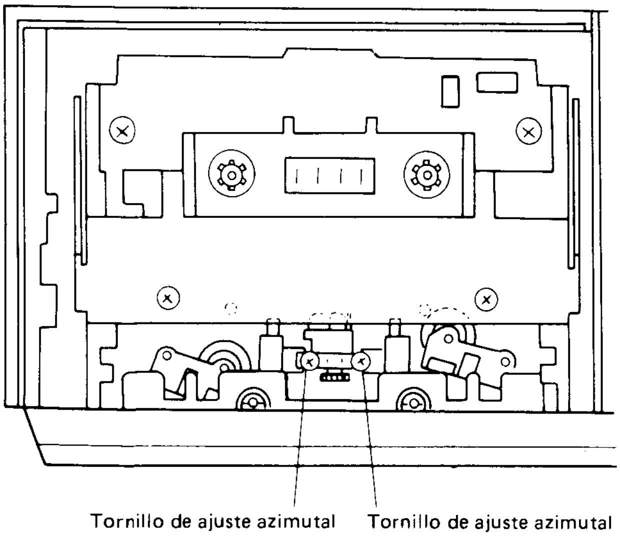


Fig. 9-1 Cinta de prueba STD-331B



Tornillo de ajuste azimutal de inversión "REV"

Tornillo de ajuste azimutal de avance "FWD"

Fig. 9-2 Ajuste azimutal del cabezal

Cinta de prueba	STD-331B
Interruptor DOLBY NR	OFF

- El canal derecho es compensado por –0,5 dB a 125Hz y por –1dB a 63Hz mediante el efecto del borde.

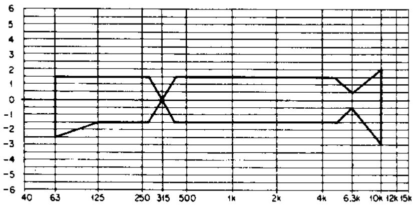


Fig. 9-3 Zona permisible de respuesta de frecuencia de reproducción

1. Ajuste azimutal del cabezal

- Regule VR102 y VR202 a las posiciones máximas, y VR101 y VR201 a las posiciones centrales mecánicas.

	Modo	Señal de entrada y cinta de prueba	Posición de ajuste	Posición de medición	Valor de ajuste	Observaciones
1	Avance-reproducción "FWD-PLAY"	Reproduzca la porción de 10kHz/ –20dB de la cinta de prueba STD-331B	Tornillo de ajuste azimutal de avance "FWD" (Fig. 9-2)	Terminales de salida de línea derecho e izquierdo	Nivel máximo de señal de reproducción	
2	Inversión-reproducción "REV-PLAY"		Tornillo de ajuste azimutal de inversión "REV" (Fig.9-2)			

2. Ajuste del ecualizador de reproducción

	Modo	Señal de entrada y cinta de prueba	Posisión de ajuste	Posición de medición	Valor de ajuste	Observaciones
1	Avance-reproducción "FWD-PLAY"	Reproduzca la porción de 315Hz y 6,3kHz/–20dB de la cinta de pruebe STD-331B	VR101 (Canal Izq.) VR201 (Canal Der.)	Terminales de salida de línea derecho e izquierdo	Regule el nivel de 6,3kHz a 0dB con respecto al nivel de reproducción de 315Hz	Variación de ±0,5dB permisible
2	Avance/ inversión/ reproducción "FWD/REV/ PLAY"	Reproduzca varias frecuencias a –20dB en la cinta de prueba STD-331B	Revisar		Los resultados deben sercomo se muestran en la zona indicada en la Fig.9-3	

3. Ajuste del nivel de reproducción

- Efectúe cuidadosamente este ajuste, y a que su resultado se usa en la graduación del nivel Dolby NR.

	Modo	Señal de entrada y cinta de prueba	Posición de ajuste	Posición de medición	Valor de ajuste	Observaciones
1	Avance-reproducción "FWD-PLAY"	Reproduzca la porción 315Hz/0dB de la cinta de prueba STD-331B	VR102 (Canal Izq.) VR202 (Canal Der.)	TP (DOL.L) (*) TP (DOL.R) (*)	–17,9dBv (127,3mV)	

* DOL.L es el cable conductor izquierdo en R116, y DOL.R es el cable conductor izquierdo en R216.

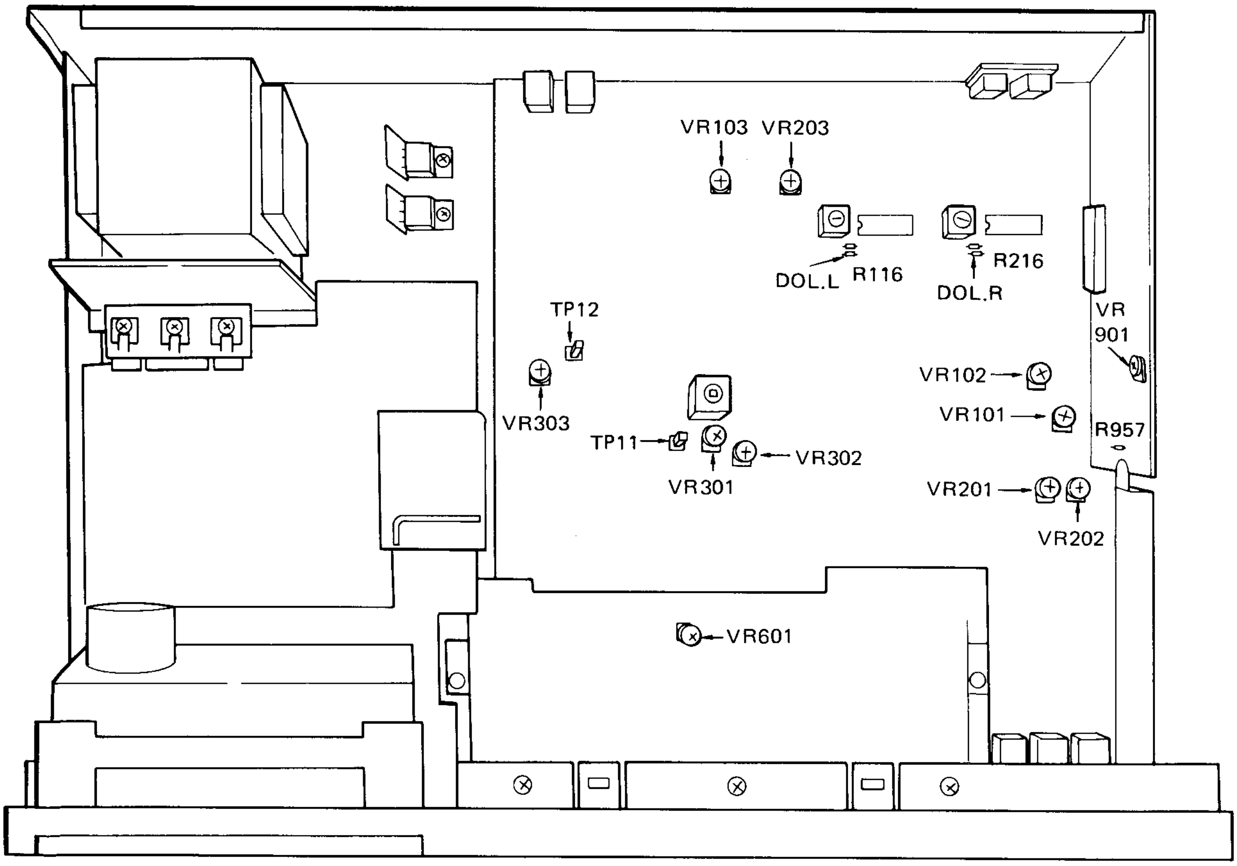


Fig. 9-4 Posiciones de ajuste

4. Ajuste de la operación de detección de punta de la cinta

	Modo	Señal de entrada y cinta de prueba	Posición de ajuste	Posición de medición	Valor de ajuste	Observaciones
1	Reproducción "PLAY"	Sin entrada — cargar una mitad de cassette vacío	VR303	TP12 (PUNTA DE LA CINTA)	$1V^{+0,2}_{-0}V$	
2	• Confirme que la punta de la cinta es correctamente detectada (en las direcciones de avance "FWD" e inversión "REV" en el modo de inversión sin fin).					

5. Ajuste del indicador de nivel

	Modo	Señal de entrada y cinta de prueba	Posición de ajuste	Posición de medición	Valor de ajuste	Observaciones
1	Grabación/ pause "REC/PAUSE"	Aplique una señal de 315Hz/ −10dBv a los terminales de entrada de linea y coloque la cinta de prueba STD-608A	Controles del nivel de grabación "REC LEVEL"	TP (DOL.L) TP (DOL.R)	−14,9dBv (180mV)	
2			VR601	Gire el VR601 completamente a la izquierda y gírelo suavemente a la derecha y pare el giro cuando se cenciendan los segmentos "+3VU"		

6. Ajuste de la respuesta de frecuencia de grabación y reproducción

• Deje en OFF el interruptor DOLBY NR.

	Modo	Señal de entrada y cinta de prueba	Posición de ajuste	Posición de medición	Valor de ajuste	Observaciones
1	Grabación/ pausa "REC/PAUSE"	Aplique una señal de 315Hz/ −30dBv a los terminales de entrada de línea y coloque la cinta de prueba STD-608A	Controles del nivel de grabación "REC LEVEL"	TP (DOL.L) TP (DOL.R)	−37,9dBv (12,7mV)	
2	Avance Grabación – reproducción "FWD REC→ PLAY"	Grabe y reproduzca las señales de 315Hz y 6,3kHz a un nivel de entrada de −30dBv	V301 (Can. Izq.) V302 (Can. Der.)	Terminales de salida de línea derecho e izuierdo	Regule mediante repetición de grabación/reproducción para obtener un nivel de reproducción de +6,3kHz a +1,0dB con respecto a la señal de 315Hz	Las variaciones de +0,5dB a +1,5dB son permisibles.
3	Grabación – Reproducción "REC→ PLAY"	Con un nivel de entrada de +30dBv, grabe y reproduzca señales de 6,3Hz a 12kHz	Revisar		Las especificaciones para FWD y REV, y DOLBY NR OFF y ON (tipos B y C) (Véase la Fig. 9-5) deben estar en conformidad (para FWD y REV)	
4	Si las especificaciones no están en conformidad (incluyendo las siguientes inspecciones), reajuste el nivel de reproducción de 6,3kHz a la un valor dentrode −1,5dB y +2,5dB con respecto a la señal de 315Hz en el procedimiento 2.					
5	Repita la inspección del procedimiento 3 usando la cinta de prueba STD-620. Las especificaciones mostradas en la Fig. 9-6 deben estar en conformidad.					
6	Repita la inspección del procedimiento 3 usando la cinta de prueba STD-610. Las especificaciones mostradas en la Fig. 9-7 deben estar en conformidad.					
7	Después del ajuste, confirme que no hay deformación y revise "baja polarización"					

7. Ajuste del nivel de grabación

• Deje en OFF el interruptor DOLBY NR.

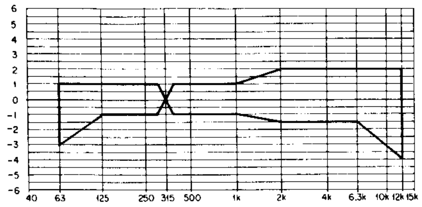
	Modo	Señal de entrada y cinta de prueba	Posición de ajuste	Posición de medición	Valor de ajuste	Observaciones
1	Grabación/ pausa "REC/PAUSE"	Aplique una señal de 315Hz/ −10dBv a los terminales de entrada de línea y coloque la cinta de prueba STD-608A	Controles del nivel de grabación "REC LEVEL"	TP (DOL.L) TP (DOL.R)	−17,9dBv (127,4mV)	
2	Grabación – reproducción "REC→ PLAY"	Grabe y reproduzca la señal de 315Hz/−10dBv	VR103 (Can. Izq.) VR203 (Can. Der.)		Regule mediante repetición de grabación/reproducción hasta obtener un nivel de reproducción de −17,9dBv (127,4mV)	
3	Grabación-reproducción "REC → "PLAY"	Grabe y reproduzca la señal de 315Hz/−10dBv en STD-620	Revisar		−17,9±1,5dBv	
4	Grabación – reproducción "REC → PLAY"	Grabe y reproduzca la señal de 315Hz/−10dBv en STD-610	Revisar		−17,9±1,5dBv	

8. Ajuste del tiempo de recuperación del sistema dbx

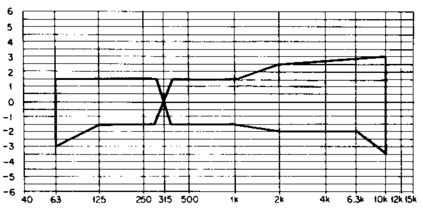
Modo	Señal de entrada y cinta de prueba	Posición de ajuste	Posición de medición	Valor de ajuste	Observaciones
STOP	Non	VR901	Terminales R957	DC15mV	

Cinta de prueba : STD-608A (NORM)

Interruptor DOLBY NR : OFF



Interruptor DOLBY NR : ON (Tipo B)



Interruptor DOLBY NR : ON (Tipo C)

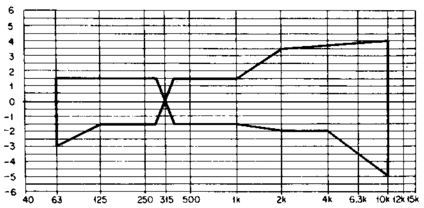
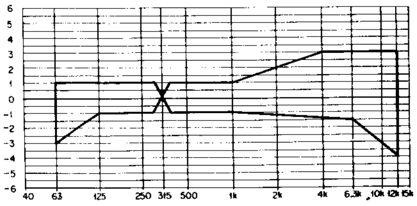


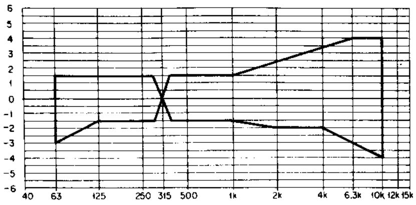
Fig. 9-5 Zonas permisibles de respuesta de frecuencia de grabación y reproducción (NORM)

Cinta de prueba : STD-620 (CrO$_2$)

Interruptor DOLBY NR : OFF



Interruptor DOLBY NR : ON (Tipo B)



Interruptor DOLBY NR : ON (Tipo C)

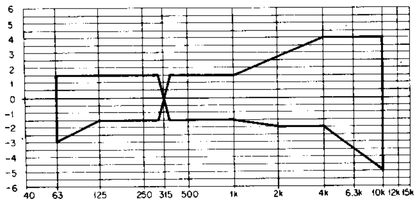
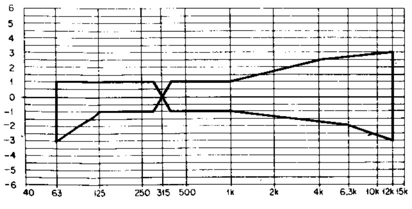


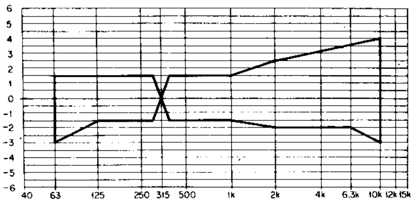
Fig. 9-6 Zonas permisibles de respuesta de frecuencia de grabación y reproducción (CrO$_2$)

Cinta de prueba : STD-610 (METAL)

Interruptor DOLBY NR : OFF



Interruptor DOLBY NR : ON (Tipo B)



Interruptor DOLBY NR : ON (Tipo C)

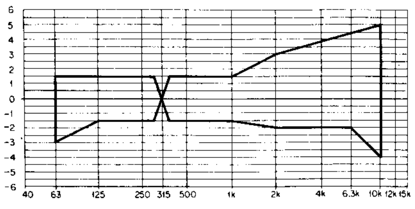
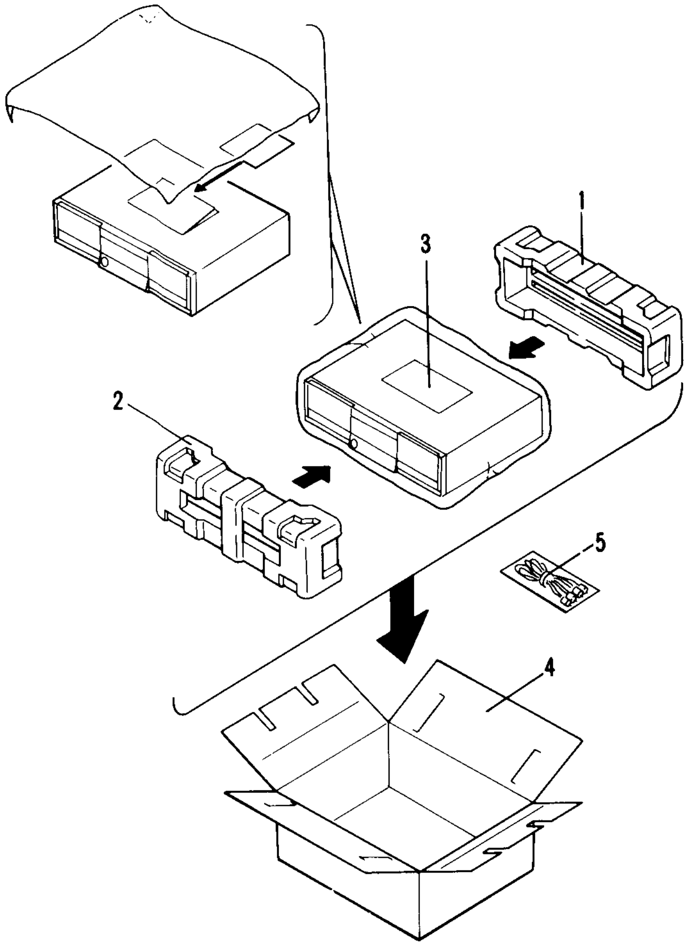


Fig. 9-7 Zonas permisibles de respuesta de frecuencia de grabación y reproducción (METAL)

10. PACKING

Mark	No.	Part No.	Description
	1	RHA-273	Pad R
	2	RHA-271	Pad F
	3	RRE-097	Operating instruction (English/German/French/Italian)
	4	RHG-898	Packing case ([BK], without D/G type)
		RHG1002	Packing case (silver model)
		RHG-900	Packing case (D/G type)
	5	RDE-082	Connection cord assembly



11. FOR HB TYPE

Line Voltage Selection for HEM and HB Types

1. Disconnect the AC power cord.
2. Remove the bonnet case.
3. Change the connection of the power transformer primary lead wires as follows:
   220V: Connect the gray lead wire to the J1402-5 terminal on the power switch unit, and connect the red lead wire to the J1402-4 terminal.
   240V: Connect the gray lead wire to the J1402-4 terminal on the power switch unit, and connect the red lead wire to the J1402-5 terminal.
4. Stick the line voltage label on the rear panel.

Description	Part No.
220V label	AAX-193
240V label	AAX-192

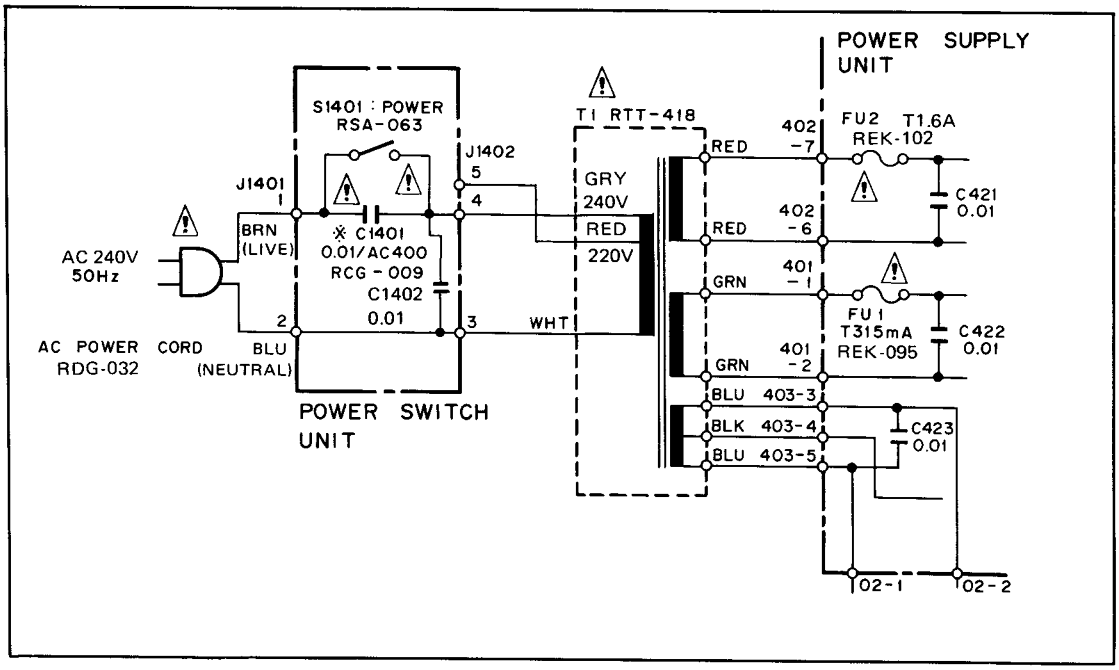
NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by “ ⊙ ” are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

The HB type is the same as the HEM type with the exception of the following sections:

Mark	Symbol & Description		Part No.		Remarks
			CT-3070R [BK]/ HEM type	CT-3070R [BK]/ HB type	
⚠		AC Power cord	RDG1003	RDG-032	
⚠ ★★	FU1	Fuse (T315mA)	REK-052	REK-095	
⚠ ★★	FU2	Fuse (T1.6A)	REK-069	REK-102	
		Operating instructions (English)	....	RRB-281	
		Operating instructions (English/German/French/Italian)	RRE-097	....	

Circuit for HB Type


POWER SUPPLY UNIT
S1401 : POWER RSA-063
J1402
5
4
3
J1401
1
2
⚠
BRN (LIVE)
※ C1401 0.01/AC400 RCG-009
C1402 0.01
AC 240V 50Hz
AC POWER CORD RDG-032
BLU (NEUTRAL)
POWER SWITCH UNIT
T1 RTT-418
GRY 240V
RED 220V
WHT
RED
402 -7
RED
402 -6
GRN
401 -1
GRN
401 -2
BLU 403-3
BLK 403-4
BLU 403-5
FU2 T1.6A REK-102
C421 0.01
FU1 T315mA REK-095
C422 0.01
C423 0.01
102-1
102-2

12. FOR D/G TYPE

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

  560Ω 56×10^1 561 .... RD¼PS $\boxed{5}\boxed{6}\boxed{1}$ J
  47kΩ 47×10^3 473 .... RD¼PS $\boxed{4}\boxed{7}\boxed{3}$ J
  0.5Ω 0R5 .... RN2H $\boxed{0}\boxed{R}\boxed{5}$ K
  1Ω 010 .... RS1P $\boxed{0}\boxed{1}\boxed{0}$ K

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

  5.62kΩ 562×10^1 5621 .... RN¼SR $\boxed{5}\boxed{6}\boxed{2}\boxed{1}$ F
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

The D/G type is the same as the HEM type with the exception of the following sections:

Mark	Symbol & Description	Part No.		Remarks
		CT-3070R [BK]/ HEM type	CT-3070R [BK]/ D/G type	
	Power supply unit	Non supply	Non supply	
	Power switch unit	Non supply	Non supply	
⚠	Strain relief	CM-22B	CM-22	
⚠	AC Power cord	PDG1003	RDG-050	
⚠ ★★	FU1 Fuse (T315mA)	REK-052	....	
⚠ ★★	FU1 Fuse (500mA)	....	REK-077	
⚠ ★★	FU2 Fuse (T1.6A)	REK-069	....	
⚠ ★★	FU2 Fuse (1.6A)	....	REK-074	
⚠ ★	T1 Power transformer (220V/240V)	RTT-418	....	
	Power transformer (120V/220V/240V)	....	RTT-419	
⚠ ★★	Line voltage selector	....	RSX-056	
	Operating instructions (English)	....	RRB-281	
	(English/German/French/Italian)	RRE-097	....	
	Side board screw	....	RBA-093	
	Side board (L)	....		
	Side board (R)	....	Non supply	
	Pad (F)	RHA-271	RHA-270	
	Pad (R)	RHA-273	RHA-272	
	Packing case	RHG-898	RHG-900	
	C1042 Ceramic capacitor 0.01/AC400V	RCG-009	....	

Power Switch Unit

- **Power switch unit for D/G type is the same as the HEM type with the exception of the following sections:**

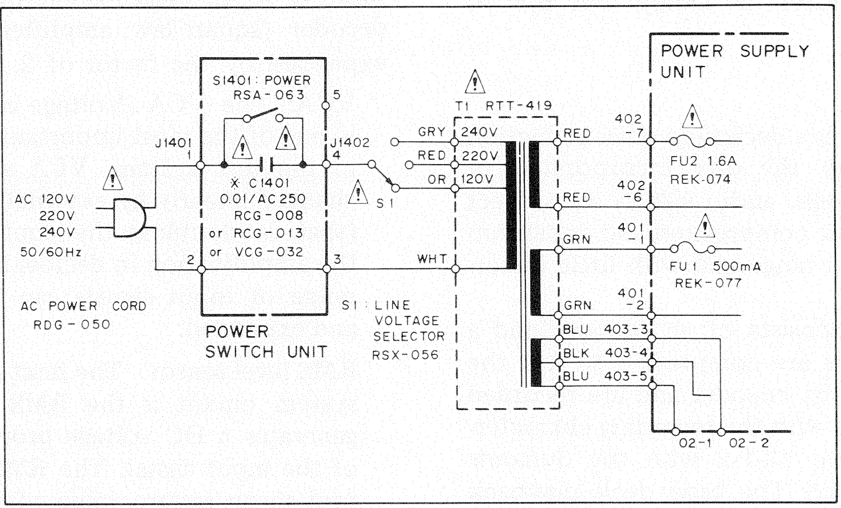
Mark	Symbol & Description	Part No.		Remarks
		HEM type	D/G type	
⚠	C1401 Ceramic capacitor	RCG-009	RCG-008	
		....	(RCG-013)	
		....	(VCG-032)	

Power Supply Unit

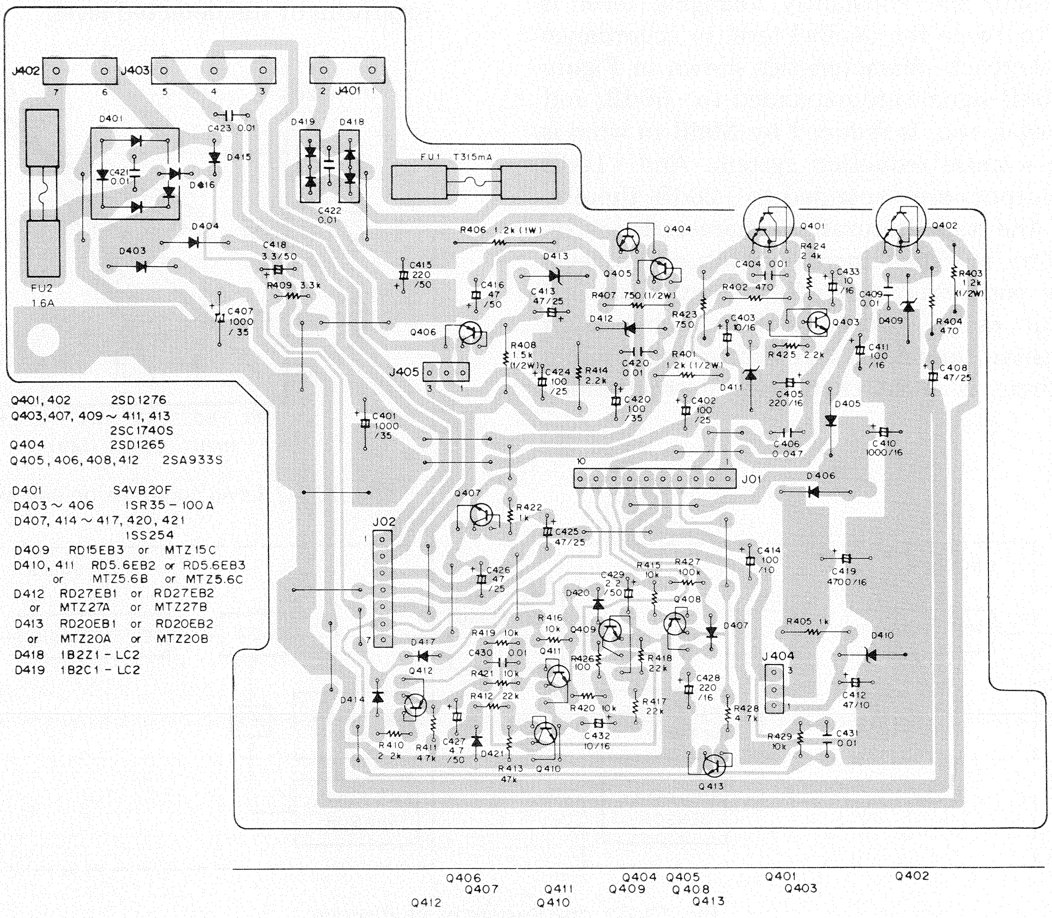
- Power switch unit for D/G type is the same as the HEM type with the exception of the following sections:

Mark	Symbol & Description	Part No.		Remarks
		HEM type	D/G type	
⚠	C421–C423 Ceramic capacitor	CKDYF103Z50	....	

Circuit for D/G Type


S1401: POWER
RSA-063
J1401
J1402
1
2
3
4
5
AC 120V
220V
240V
50/60Hz
AC POWER CORD
RDG-050
X C1401
0.01/AC250
RCG-008
or RCG-013
or VCG-032
POWER
SWITCH UNIT
S1
S1 : LINE VOLTAGE SELECTOR
RSX-056
T1 RTT-419
GRY
RED
OR
WHT
240V
220V
120V
RED
RED
GRN
GRN
BLU
BLK
BLU
402-7
402-6
401-1
401-2
403-3
403-4
403-5
POWER SUPPLY UNIT
FU2 1.6A
REK-074
FU1 500mA
REK-077
02-1
02-2

Power Supply Unit for D/G Type


J402
J403
J401
7
6
5
4
3
2
1
D401
C423 0.01
D415
D416
C421 0.01
D419
D418
C422 0.01
FU1 T315mA
FU2
1.6A
D404
D403
C418 3.3/50
R409 3.3k
C415 220/50
C416 47/50
C407 1000/35
R406 1.2k (1W)
D413
Q404
Q405
Q401
Q402
R424 2.4k
C404 0.01
C433 10/16
R403 1.2k (1/2W)
R402 470
C413 47/25
R407 750 (1/2W)
C409 0.01
D412
R423 750
C403 10/16
Q403
D409
R404 470
Q406
R408 1.5k (1/2W)
C424 100/25
R414 2.2k
C420 0.01
R401 1.2k (1/2W)
R425 2.2k
C411 100/16
C408 47/25
J405
D411
C405 220/16
C420 100/35
C402 100/25
C401 1000/35
D405
C406 0.047
C410 1000/16
J01
D406
Q407
R422 1k
C425 47/25
J02
C414 100/10
C419 4700/16
C426 47/25
C429 2.2/50
R415 10k
R427 100k
D420
Q408
R416 10k
Q409
D407
R405 1k
D410
D417
R419 10k
C430 0.01
Q411
R426 100
R418 22k
J404
Q412
R421 10k
C428 220/16
C412 47/10
D414
R412 22k
R420 10k
R417 22k
R428 4.7k
C427 4.7/50
C432 10/16
R429 10k
C431 0.01
R410 2.2k
R411 4.7k
D421
R413 47k
Q410
Q413
Q401, 402 2SD1276
Q403, 407, 409 ~ 411, 413 2SC1740S
Q404 2SD1265
Q405, 406, 408, 412 2SA933S
D401 S4VB20F
D403 ~ 406 1SR35-100A
D407, 414 ~ 417, 420, 421 1SS254
D409 RD15EB3 or MTZ15C
D410, 411 RD5.6EB2 or RD5.6EB3 or MTZ5.6B or MTZ5.6C
D412 RD27EB1 or RD27EB2 or MTZ27A or MTZ27B
D413 RD20EB1 or RD20EB2 or MTZ20A or MTZ20B
D418 1B2Z1-LC2
D419 1B2C1-LC2
Q406
Q407
Q412
Q411
Q410
Q404
Q405
Q409
Q408
Q413
Q401
Q403
Q402

13. CIRCUIT DESCRIPTIONS

13.1 OUTLINE OF MAIN SECTIONS

Playback Equalizer

A low-noise operation amplifier IC (M5220L) is used.

Dolby NR Section

This section features a Dolby NR B/C IC (AN7370K).

dbx System

The "dbx system" is a decilinear noise reduction system developed by the dbx Incorporated of America. In this system, audio signals are subject to accurate logarithmic compression and expansion over a very wide level range and with little distortion.

The dbx system consists of an encoder and a decoder. Input signals are compressed to 1/2 the decibel level by the dbx encoder and are recorded on tape in accordance with the recording characteristics shown in Figure 13-1-2 with the dynamic range reduced by half. The tape deck playback output signal (compressed signal) is passed to the decoder where the constantly changing level is expanded to twice the decibel level in accordance with the playback characteristics shown in Figure 13-1-2. -30dB signals are expanded to -60dB, and the noise level, too, is reduced by 30dB in what is effectively a noise reduction system. And +10dB playback outputs are expanded to +20dB, thereby improving the tape saturation characteristics by 10dB by the so-called increased saturation level effect. The end result is an effective expansion of the dynamic range. And since these compression and expansion operations are linear logarithmic changes, there is little chance of misoperations occurring. For example, failure to match the recording and playback levels does not result in deterioration of the overall frequency response.

*** dbx System configuration**

The major components of the dbx system are the encoder (route amplifier) where the dynamic range of input signals is compressed by 1/2, and a decoder (square-law amplifier) where signals are expanded by the factor of 2. (See Figure 13-1-1.)

VCA: The VCA (Voltage controlled Amplifier) is one of the most important component circuits in the dbx system. VCA amplification can be changed linearly by external DC control currents (that is, doubling the control current doubles the amplification in decibel terms). The dynamic range of input signals can thus be compressed and expanded.

RMS level sensor: The next most important dbx system circuit is the RMS level sensor which generates a DC voltage proportional to the size of the input signal. The RMS sensor detects the root mean square value of the input signal and converts it to a DC voltage proportional to the logarithm of the detected level.

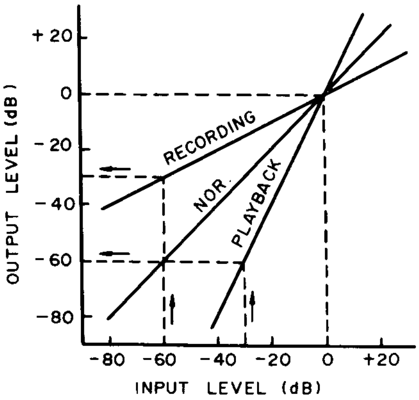


Fig. 13-1-2 Level compression and expansion

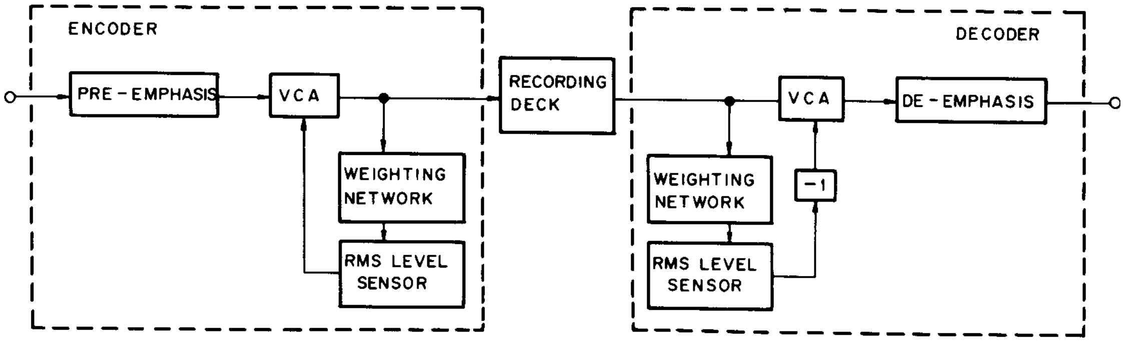


Fig. 13-1-1 dbx System block diagram

Emphasis: Since high frequencies in the input signal are boosted by pre-emphasis, and returned to the original level by de-emphasis during playback, the high end noise is reduced by some 10dB in addition to the intrinsic noise reduction effect achieved by compression and expansion. This emphasis action is also effective in reducing harmonic distortion generated during recording and in improving the hiss envelope tracing.

Weighting network: If signals where the high frequencies have been boosted by pre-emphasis in the encoder are recorded directly onto tape, the tape's high end saturation point may be exceeded resulting in generation of distortion. To avoid this, the VCA amplification must be reduced by an appropriate degree for signals containing a relatively high proportion of high frequency components. This is achieved by inserting weighting networks before and after the RMS level sensor to increase the sensitivity of the level sensor for signals with a large high frequency content, thereby lowering the VCA amplification.

*** dbx System operation**

The input signal is passed to the VCA via a pre-emphasis stage. Part of the VCA output is passed to the RMS level sensor via a weighting network, resulting in the generation of a DC voltage at the RMS level sensor output in proportion to the size of the input signal. The VCA amplification is varied according to the size of this DC voltage, and the dynamic range of the input signal is reduced by 1/2 in terms of decibel level before

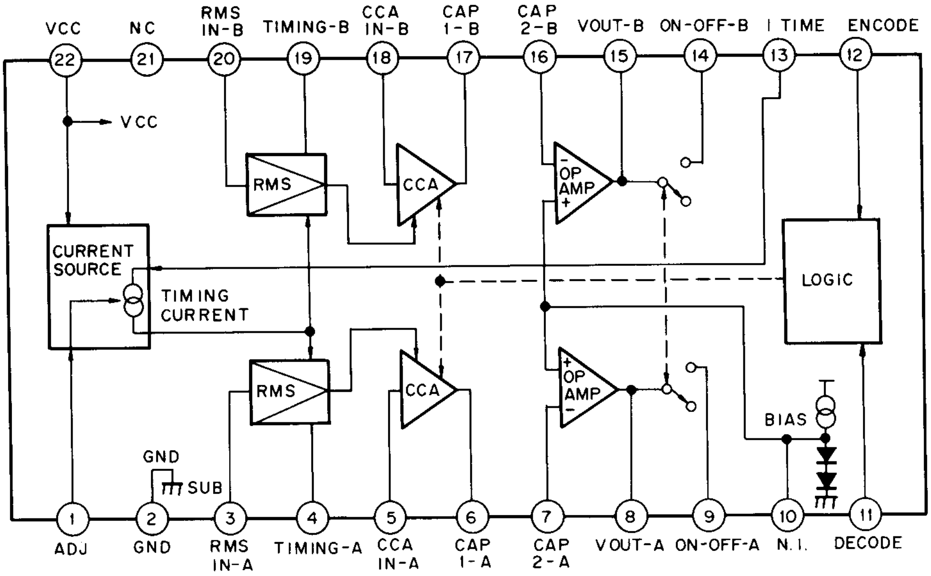


Fig. 13-1-3 AN6291 Block diagram

Pin No.	Pin name	Description	Pin No.	Pin name	Description
1	ADJ	Timing current adjustment pin	12	ENCODE	Encode/decode selector switch (encode)
2	GND	Ground	13	I TIME	Timing current circuit power
3	RMS IN-A	Channel A RMS circuit input	14	ON-OFF-B	Channel B electronic switch
4	TIMING-A	Channel A timing capacitor pin	15	VOUT-B	Channel B output
5	CCA IN-A	Channel A CCA circuit input	16	CAP-2-B	Channel B output circuit input
6	CAP-1-A	Channel A CCA circuit output	17	CAP-1-B	Channel B CCA circuit output
7	CAP-2-A	Channel A output circuit input	18	CCA-IN-B	Channel B CCA circuit input
8	VOUT-A	Chanel A output	19	TIMING-B	Channel B timing capacitor pin
9	ON-OFF-A	Channel A electronic switch	20	RMS IN-B	Channel B RMS circuit input
10	N.I.	Bias circuit decoupling	21	NC	Internal connection pin
11	DECODE	Encode/decode selector switch (decode)	22	Vcc	Power supply

Fig. 13-1-4 AN6291 Pin description

being passed to the recording deck.

The playback signal is passed to the decoder with part of the signal being passed via a weighting network to the RMS level sensor. The sensor output becomes a DC voltage with the opposite sign to the encoder, and this is used to control the VCA. The input signal dynamic range is expanded to twice the decibel level before being passed to the output via the de-emphasis stage.

*** The CT-3070R (BK) dbx system**

The dbx system featured in the CT-3070R (BK) is incorporated in an IC (AN6291) containing dbx circuits for two channels. Although the VCA in AN6291 is a CCA (Current Controlled Amplifier) type of variable gain amplifier, it is basically the same as the VCA. This type of dbx system, therefore, is called the type II system. The main difference between the type I and type II systems is the larger weighting network time constant in type II, resulting in a higher sensitivity to high frequency components. As a result, the encoder amplification is lower at higher frequencies, thereby enabling the system to operate more effectively in respect to the saturation point of the cassette tape.

Recording Amplifier

Features an operational amplifier IC (M5218L). This amplifier copes with different types of tapes by peaking element switching in the negative feedback loop.

Recording Bias Section

Features a push-pull oscillator with the line voltage being switched by the auto tape selector for use of NORM, CrO_2, and METAL tapes.

System Control Section

Features a microcomputer (PD3031A) for control of mechanical systems and signal routes, and an input port expander IC (LC7800). Switching of mechanical operation mode makes use of an assist motor with feedback of the operational status in digital code form to the microcomputer.

Motor Drive Section

Operation of the reel and assist motors is controlled by the motor drive IC (BA6109) upon reception of an input from PA3031A.

Blank Tape Portion Detector

Features an audio level sensor IC (BA335). An H level output is obtained from BA335 (pull-up resistance required for this open collector) when an audio input signal is applied (cue or review mode playback signal), and an L level output is obtained when there is no input signal. This output is passed to PD3031A where the blank portion of tape is identified.

Leader Tape Detector

This optical type leader tape detector employs an LED and photo transistor to detect the difference in transparency to light between the leader tape and magnetic tape sections. The detected signal is identified by DC level comparator and passed to the microcomputer.

Tape End Detector

The tape end detector features an optical system detector with an LED and photo transistor mounted on the reel base. The detector signal is switched to H and L level continuously during tape transport, but stops at H or L once the tape stops. Input of this signal to the microcomputer results in detection of the end of tape.

Remote Control Section

External remote control serial code data signals are passed to PD3031A where in instruction decisions are made.

Level Meter

Input signals from the amplifier are converted to "wide range" by a 1/4 multiplier compressor circuit before being passed to the peak hold level meter driver IC (LC7555) via the time constant circuit. Left and right channel segment actuator outputs generated according to the input level of the LC7555 input signals are passed via a buffer circuit to the fluorescent display tube.

Block Diagram

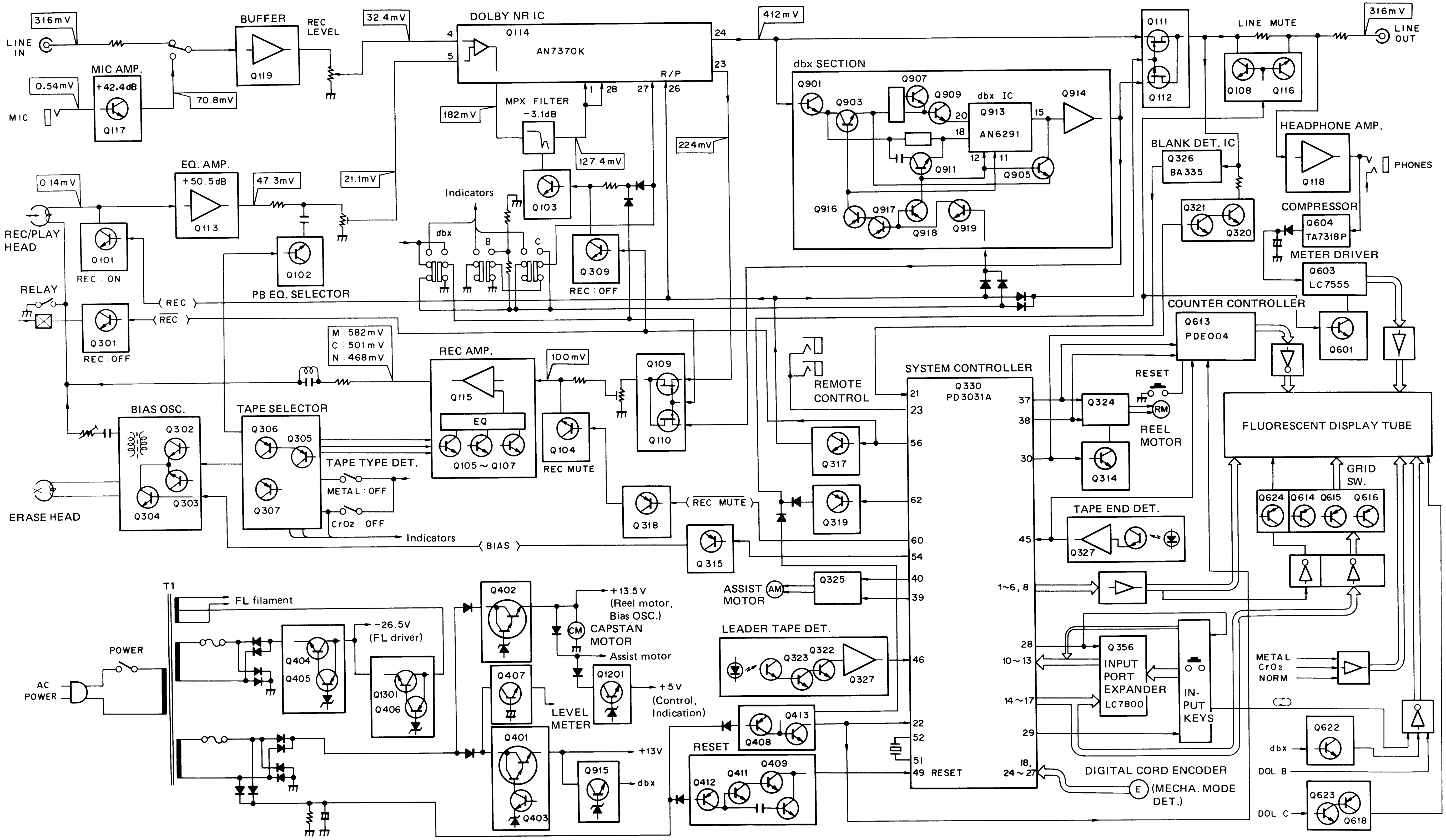

316mV
LINE IN
BUFFER
REC LEVEL
Q119
MIC AMP.
0.54mV
+42.4dB
Q117
MIC
70.8mV
32.4mV
DOLBY NR IC
Q114
AN7370K
4
5
24
23
R/P
1
28
27
26
MPX FILTER
-3.1dB
182mV
127.4mV
224mV
21.1mV
412mV
dbx SECTION
Q901
Q903
Q907
Q909
dbx IC
Q913
AN6291
Q914
20
15
18
12
11
Q911
Q905
Q916
Q917
Q918
Q919
Q111
Q112
LINE MUTE
Q108
Q116
316mV
LINE OUT
HEADPHONE AMP.
Q118
PHONES
BLANK DET. IC
Q326
BA335
Q321
Q320
COMPRESSOR
Q604
TA7318P
METER DRIVER
Q603
LC7555
COUNTER CONTROLLER
Q613
PDE004
Q601
0.14mV
EQ. AMP.
+50.5dB
Q113
47.3mV
REC/PLAY HEAD
Q101
REC : ON
Q102
PB EQ. SELECTOR
Q103
Indicators
dbx
B
C
Q309
REC : OFF
RELAY
REC
Q301
REC : OFF
M : 582mV
C : 501mV
N : 468mV
REC AMP.
Q115
EQ
Q105 ~ Q107
100mV
Q104
REC MUTE
Q109
Q110
REMOTE CONTROL
SYSTEM CONTROLLER
Q330
PD3031A
21
23
56
62
60
54
40
39
46
22
52
51
49 RESET
37
38
30
45
1~6, 8
28
10~13
14~17
29
18, 24~27
RESET
Q324
RM
REEL MOTOR
Q314
FLUORESCENT DISPLAY TUBE
GRID SW.
Q624
Q614
Q615
Q616
TAPE END DET.
Q327
BIAS OSC.
Q302
Q303
Q304
ERASE HEAD
TAPE SELECTOR
Q306
Q305
Q307
TAPE TYPE DET.
METAL : OFF
CrO₂ : OFF
Indicators
BIAS
Q315
Q317
Q318
REC MUTE
Q319
ASSIST MOTOR
AM
Q325
LEADER TAPE DET.
Q323
Q322
Q327
Q356
INPUT PORT EXPANDER
LC7800
IN-PUT KEYS
DIGITAL CORD ENCODER
E
(MECHA. MODE DET.)
METAL
CrO₂
NORM
dbx
Q622
DOL B
DOL. C
Q623
Q618
T1
FL filament
POWER
AC POWER
Q404
Q405
-26.5V
(FL driver)
Q1301
Q406
Q402
+13.5V
(Reel motor, Bias OSC.)
CM
CAPSTAN MOTOR
Assist motor
Q407
LEVEL METER
Q1201
+5V
(Control, Indication)
Q401
Q403
+13V
Q915
dbx
RESET
Q408
Q413
Q409
Q411
Q412

Fig. 13-1-5 Block diagram

LC7555 Pin Description

Pin No.	Pin Name	Description
31	OL 1	Left channel fluorescent display tube drive output pins. (P channel open drain)
32	OL 2	
33	OL 3	
34	OL 4	
35	OL 5	
36	OL 6	
7	OL 7	
8	OL 8	
9	OL 9	
10	OL10	
11	OL11	
12	OL12	
37	OR 1	Right channel fluorescent display tube drive output pins. (P channel open drain)
38	OR 2	
39	OR 3	
40	OR 4	
41	OR 5	
42	OR 6	
1	OR 7	
2	OR 8	
3	OR 9	
4	OR10	
5	OR11	
6	OR12	
13	MON	(Not used)
14	TS	
15	PHR	
16	M/A	
17	MMR	Right channel peak hold time setting pin.
18	MML	Left channel peak hold time setting pin.
19	Vss	Power supply 0V connection.
20	MUT	External connection for resetting of peak hold function (to prescribed time) when power is switched on, and setting input pins to Vss level.
21	OSC	External connection for internal clock oscillator CR circuit.
22	TEST 2	(Not used)
23	TEST 1	
24	ADJ	Meter adjustment pin ("+3" indicator adjusted to come on when at the Dolby NR reference input level).
25	R IN	Right channel indicator signal input pin.
26	L IN	Left channel indicator signal input pin.
27	NC	Internal connection pin.
28	ADD	Power supply pin.
29	VREF	A/D converter reference voltage connector pin.
30	VPS	Segment brightness control pin.

Fig. 13-1-6 LC7555 pin description

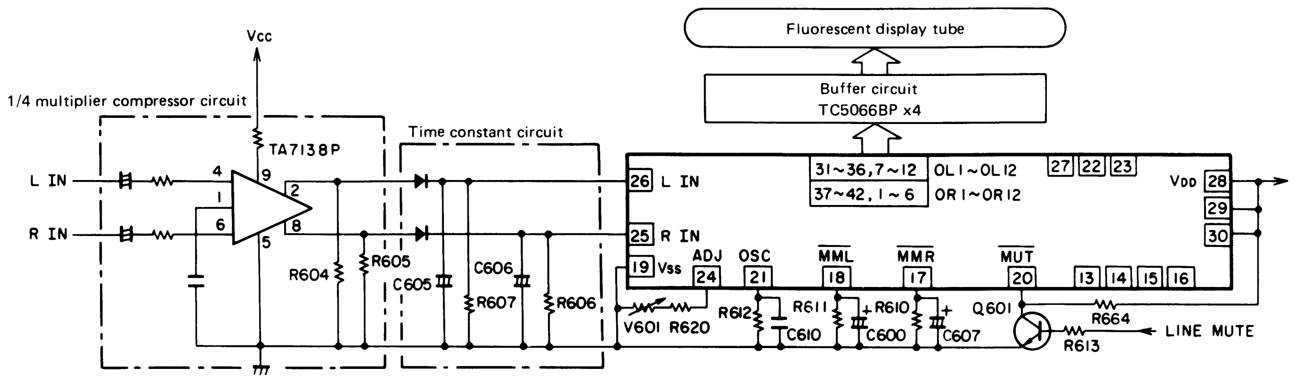

Vcc
1/4 multiplier compressor circuit
TA7138P
Time constant circuit
Fluorescent display tube
Buffer circuit
TC5066BP x4
L IN
R IN
R604
R605
C605
C606
R607
R606
26 L IN
25 R IN
19 Vss
ADJ 24
OSC 21
MML 18
MMR 17
MUT 20
31~36,7~12 OL1~OL12
37~42,1~6 OR1~OR12
27 22 23
13 14 15 16
VDD 28 29 30
V601 R620
R612
R611
C610
R610
C600
C607
Q601
R664
R613
LINE MUTE

Fig. 13-1-7 Level meter circuit

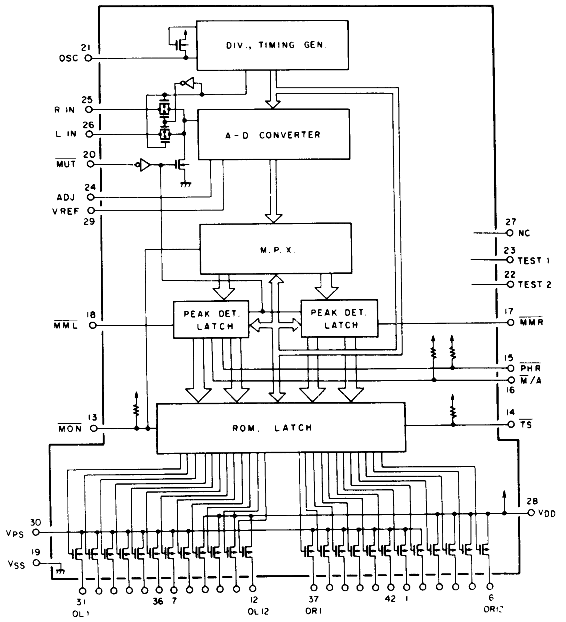

DIV., TIMING GEN.
A-D CONVERTER
M.P.X.
PEAK DET. LATCH
PEAK DET. LATCH
ROM. LATCH
OSC
R IN
L IN
MUT
ADJ
VREF
MML
MON
VPS
Vss
NC
TEST 1
TEST 2
MMR
PHR
M/A
TS
VDD
OL1
OL12
OR1
OR12

Fig. 13-1-8 LC7555 block diagram

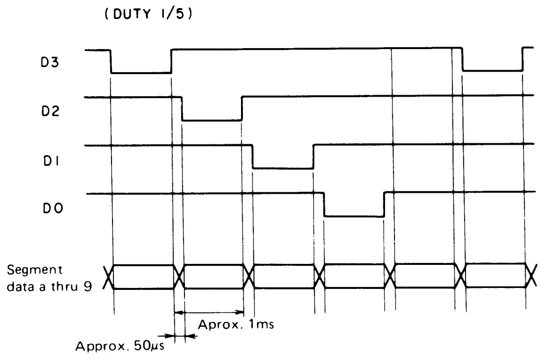


Fig. 13-1-9 FL grid signal timing chart

Tape Counter

The reel base rotation detector pulses used by the tape end detector are passed to the counter microcomputer (PDE004) which counts every second pulse. With a duty 1/5 dynamic display, the count signals are passed to the fluorescent display tube via a buffer circuit for a four digit display. Counting up/down switching involves the application of reel motor control signals (RML and RMR) from the system control microcomputer to the UP and DOWN pins. The counter is reset to 0000 when an L level signal is applied to the counter reset pin for at least 16 msec.

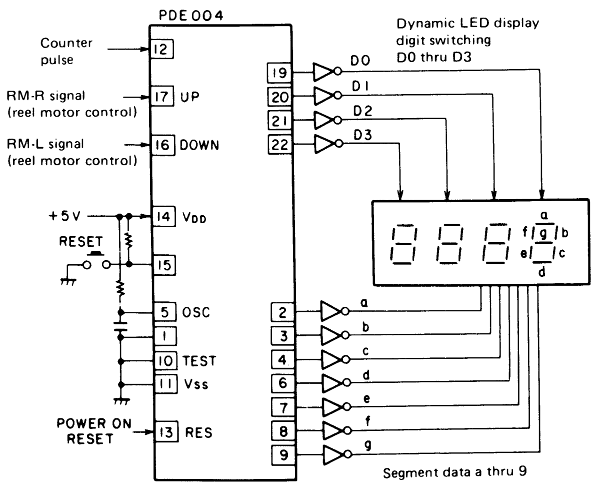
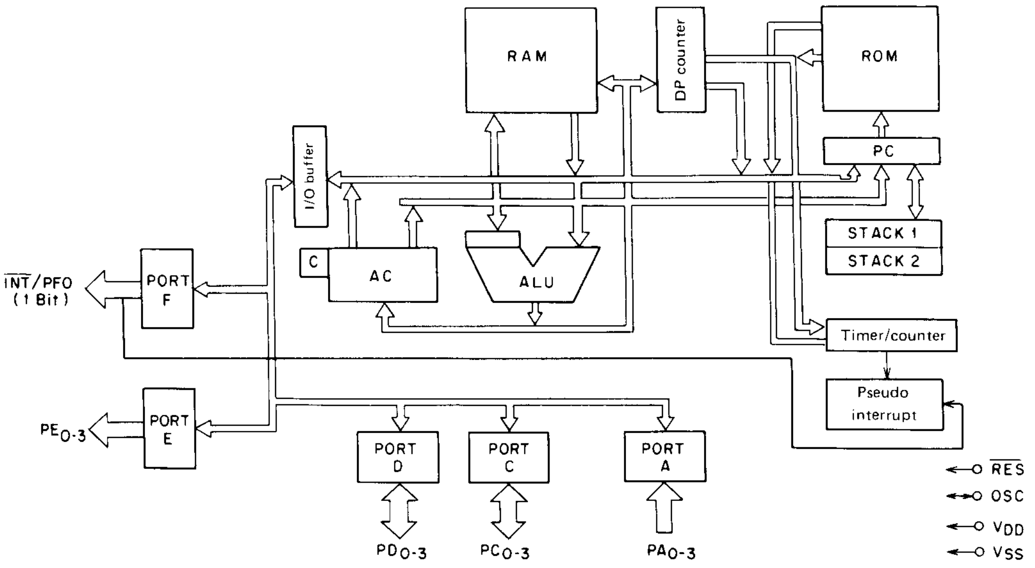

PDE004
Counter pulse
RM-R signal (reel motor control)
RM-L signal (reel motor control)
UP
DOWN
+5V
RESET
VDD
OSC
TEST
Vss
POWER ON RESET
RES
Dynamic LED display digit switching D0 thru D3
D0
D1
D2
D3
a
b
c
d
e
f
g
Segment data a thru 9

Fig. 13-1-10 Tape counter circuit


RAM
DP counter
ROM
PC
I/O buffer
C
AC
ALU
STACK 1
STACK 2
Timer/counter
Pseudo interrupt
$\overline{\text{INT}}$/PFO (1 Bit)
PORT F
PORT E
$PE_{0\text{-}3}$
PORT D
PORT C
PORT A
$PD_{0\text{-}3}$
$PC_{0\text{-}3}$
$PA_{0\text{-}3}$
$\overline{\text{RES}}$
OSC
V_{DD}
V_{SS}

AC : Accumulator
ALU : Arithmetic & logic unit
DP : Data pointer
C : Carry FF
PC : Program counter

(Pin name)
OSC : Oscillator
$\overline{\text{INT}}$/PFO : Interrupt output port F_0
$\overline{\text{RES}}$: Reset
PA_0-3 : Input ports A_0-3
PC_0-3 : Input/output ports C_0-3
PD_0-3 : Input/output ports D_0-3
PE_0-3 : Output ports E_0-3
TEST : Test

Fig. 13-1-11 PDE004 block diagram

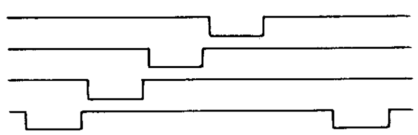
Pin No.	Pin Name	Description								
1	PD0	Zero pulse output. L level output when counter display is 0000 (not used).								
2	PD1	a segment display output.								
3	PD2	b segment display output.								
4	PD3	c segment display output.								
5	OSC	Built-in clock oscillator CR circuit connector pin.								
6	PE0	d segment display output.								
7	PE1	e segment display output.								
8	PE2	f segment display output.								
9	PE3	g segment display output.								
10	TEST	LSI test pin. Normally connected to Vss (0V).								
11	Vss	Connected to power supply 0V.								
12	$\overline{\text{INT}}$/PFO	Counter pulse input.								
13	$\overline{\text{RES}}$	Reset input pin.								
14	VDD	Power supply pin. Normally connected to +5V.								
15	PA0	Counter reset pin. 0000 counter display when input applied in excess of approx. 16ms.								
16	PA1	Up/down	L	No change	H	Down	L	Up	H	No change
17	PA2	counter setting	L		L	counting	H	counting	H	
18	PA3	Operational mode switching. Count 1 at falling edge of every second counter pulse input when pin is at H level (display 1/5 duty).								
19	PC0	Dynamic display scan signal output (operational mode switching: 1/5 duty when at H level)	Least significant digit	D0						
20	PC1			D1						
21	PC2			D2						
22	PC3		Most significant digit	D3						

Fig. 13-1-12 PDE004 pin description

13.2 SYSTEM CONTROL IC (PD3031A) SPECIFICATIONS

PD3031A controls the deck operations (tape transport mechanism consisting of two motors plus one assist motor) by coupling with the input port expansion IC (LC7800).

The PD3031A port allocations are listed in Figure 13-2-1, and the pin names of the input port expansion IC are listed in Figure 13-2-2.

13.2.1 Reception of Key Inputs

*** Reception conditions**

(1) Key input sampling time of 20ms to prevent misoperation by external noise and chattering during reception of key inputs.

(2) Although key inputs can be received during assist drive operations, the operation corresponding to the key input is not executed until the assist drive has been completed.

*** Recording prevention function (REC INH)**

Tape transport is put into stop mode when a REC input is applied with REC INH at H level during tape transport in either deck and in either direction. If there is no REC key input, however, the deck is not put into stop mode.

And if a FWD or REV key input which results in reversing the tape transport direction during recording, recording/pause, or recording mute mode, or if REC INH is H following the direction reversal, the deck is put into stop mode after the direction has been reversed.

I—A-REC INH	Deck FWD transport REC INH input.
I—B-REC INH	Deck REV transport REC INH input.

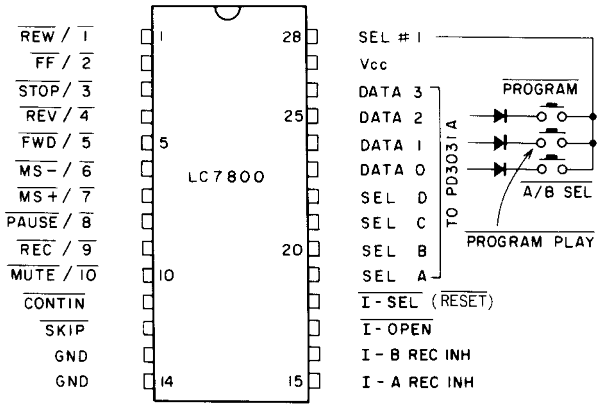
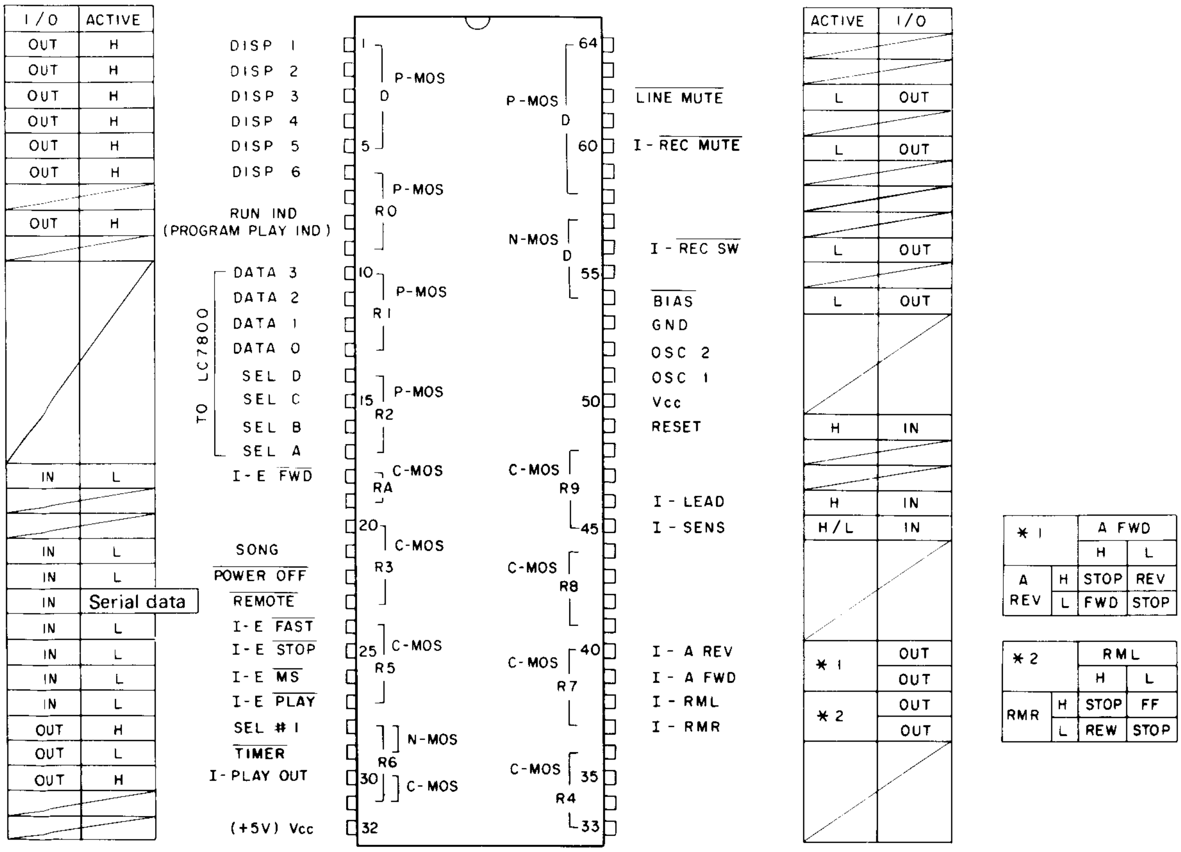

REW / 1
FF / 2
STOP / 3
REV / 4
FWD / 5
MS− / 6
MS+ / 7
PAUSE / 8
REC / 9
MUTE / 10
CONTIN
SKIP
GND
GND
1
5
10
14
15
20
25
28
LC7800
SEL # 1
Vcc
DATA 3
DATA 2
DATA 1
DATA 0
SEL D
SEL C
SEL B
SEL A
I-SEL (RESET)
I-OPEN
I-B REC INH
I-A REC INH
TO PD3031A
PROGRAM
A/B SEL
PROGRAM PLAY

Fig. 13-2-2 LC7800 Pin name


I/O
ACTIVE
OUT H DISP 1
OUT H DISP 2
OUT H DISP 3
OUT H DISP 4
OUT H DISP 5
OUT H DISP 6
OUT H RUN IND (PROGRAM PLAY IND)
TO LC7800
DATA 3
DATA 2
DATA 1
DATA 0
SEL D
SEL C
SEL B
SEL A
IN L I-E FWD
IN L SONG
IN L POWER OFF
IN Serial data REMOTE
IN L I-E FAST
IN L I-E STOP
IN L I-E MS
IN L I-E PLAY
OUT H SEL # 1
OUT L TIMER
OUT H I-PLAY OUT
(+5V) Vcc
1
5
10
15
20
25
30
32
33
35
40
45
50
55
60
64
P-MOS D
P-MOS R0
P-MOS R1
P-MOS R2
C-MOS RA
C-MOS R3
C-MOS R5
N-MOS R6
C-MOS
P-MOS D
N-MOS D
C-MOS R9
C-MOS R8
C-MOS R7
C-MOS R4
LINE MUTE L OUT
I-REC MUTE L OUT
I-REC SW L OUT
BIAS L OUT
GND
OSC 2
OSC 1
Vcc
RESET H IN
I-LEAD H IN
I-SENS H/L IN
I-A REV
I-A FWD
I-RML
I-RMR
*1 OUT
*1 OUT
*2 OUT
*2 OUT
ACTIVE
I/O

*1		A FWD	
		H	L
A REV	H	STOP	REV
	L	FWD	STOP

*2		RML	
		H	L
RMR	H	STOP	FF
	L	REW	STOP

Fig. 13-2-1 PD3031A Port allocation

*** Tape transport input keys**

(1) Basic key inputs
The basic deck control keys (including the ten numerical keys). See Figure 13-2-3.

(2) Function key inputs
The key switching inputs I SEL (RESET), and PROGRAM. See Figure 13-2-4.

(3) Auxiliary key inputs
Keys which operate only after certain modes have been set by another key. A/B SEL, RUN (PROGRAM PLAY), MUTE, and SKIP. See Figure 13-2-5.

*** Multi-mode keys**

The following two modes are set by the I SEL, and PROGRAM inputs with the basic keys and MUTE key.

NON PROGRAM .... (1) Deck basic keys plus REC MUTE key mode.
PROGRAM .... (2) Ten key mode (numerical key 1 thru 10).

The correspondence between (1) and (2) is shown in Figure 13-2-6.

Port Name	ACTIVE	Description
REW/1	L	REW and key 1 input
FF/2	L	FF and key 2 input
STOP/3	L	STOP and key 3 input
REV/4	L	REV-PLAY and key 4 input
FWD/5	L	FWD-PLAY and key 5 input
MS⊖/6	L	(−) SEARCH and key 6 input
MS⊕/7	L	(+) SEARCH and key 7 input
PAUSE/8	L	PAUSE and key 8 input
REC/9	L	REC and key 9 input
*MUTE/10	L	REC MUTE and key 10 input
OPEN	L	Door detector input — door open: L

* Although MUTE is not included among the basic tape transport keys, it has been included in this list because of key 10.

Fig. 13-2-3 Basic key inputs

Port Name	ACTIVE	Description
I SEL	L	Transport I key mode switching input
PROGRAM	L	Numerical key switching (initialized state recovery)

Fig. 13-2-4 Function key inputs

Port Name	ACTIVE	Description
A/B SEL	L	Programming A/B switching input (*1)
RUN	L	Program RUN key input (*2)
MUTE	L	REC MUTE key input
SKIP	L	SKIP key input (*3)

*1: PROGRAM SIDE B
*2: PROGRAM START

Fig. 13-2-5 Auxiliary key inputs

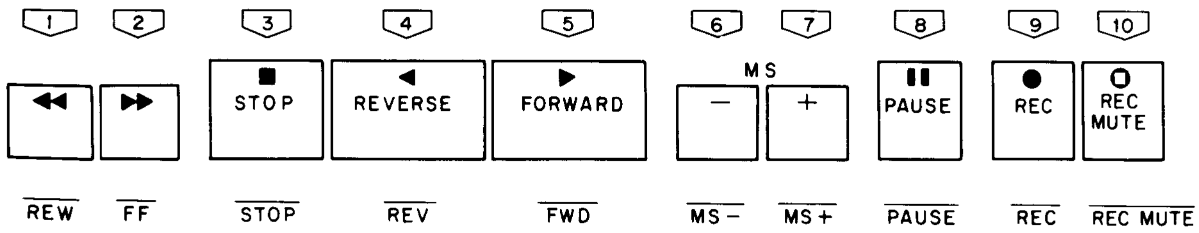


Fig. 13-2-6 Multi-mode key input

*** One-touch recording**

(1) Deck is switched to REC mode by the REC input.
REC input.

(2) Recording pause mode can be set by pressing the REC key during stop pause or playback pause mode.

*** Pause operations**

(1) Pause mode is released by pressing the PAUSE key.

(2) Pause mode can also be released by pressing the STOP, FF, REW, MS+, or MS– key.

*** Multiple input of transport keys, or transport key and other function key**

Inputs are not accepted if keys are pressed exactly at the same time (simultaneous reading of input data).

*** Multiple input of tape transport control keys**

(1) If key 1 and key 2 are pressed together, and mutual transition is possible between the key 1 and key 2 transport modes, or if multiple pressing has been permitted for those keys, the mode of the last key to be released becomes valid.

(a) When the MUTE and PAUSE keys are pressed together

Mutual transition is possible between recording pause and recording mute modes. If these two keys are pressed together during recording mode, the deck is set to recording pause mode. And if these two keys are pressed together during recording pause mode and the PAUSE key is released first, the deck is put into recording mute mode. And the deck remains in recording pause mode if the MUTE key is released first.

(b) When the REC key is pressed together with the FWD or REV key

Although transition from playback to recording mode is possible, transition from recording to playback mode has not been defined. Therefore, if the REC key is pressed together with the FWD or REV key, the deck is switched to recording mode irrespective of which key is released first.

(c) When REC and PAUSE keys are pressed together

If the REC and PAUSE keys are pressed together, the deck is switched to recording pause mode irrespective of which key is released first.

(d) When REC and MUTE keys are pressed together

Mutual transition between recording and recording mute modes is possible. If these two keys are pressed together the deck is set to recording mute mode. The order in which the keys are released is important, the deck being put into recording mute mode is the REC key is released first, or to recording mode if the MUTE key is released first.

(e) When FWD or REV and PAUSE keys are pressed together

Although playback mode can be switched to playback pause mode by pressing the PAUSE key, transition from playback pause mode to playback mode by pressing the PLAY key has not been defined. Therefore, if the FWD or REV key is pressed together with the PAUSE key, the deck is switched to playback pause mode irrespective or which key is released first.

13.2.2 REC MUTE Function

(1) If the MUTE key is pressed during recording or recording pause mode, the deck is switched to recording mute mode for 4.5 seconds, and then back to recording pause mode (Auto space mute). The REC IND blinks on and off (640ms cycle) during this 4.5 second interval.

(2) If the MUTE key is kept depressed for at least 4.5 seconds during recording or recording pause mode, the deck is switched to recording mute mode until the key is released again, after which the deck is put into recording pause mode. The REC IND blinks on and off while the MUTE key remains depressed.

(3) If the PAUSE key is pressed during Auto space mute mode, Auto space mute is changed to recording pause mode.

(4) If the REC key is pressed during Auto space mute mode, Auto space mute is changed to recording mode.

(5) If the REC and MUTE keys are pressed together, the tape transport assist operation is executed in recording mode, and the deck subsequently switched to Auto space mute mode once that operation has been completed.

(6) If the PAUSE and MUTE keys are pressed together during recording pause mode, that recording pause mode is maintained.

(7) Although FWD and REV key inputs are accepted during recording mute mode, there is no change if the key in the same direction as the tape transport is pressed. If the opposite direction key is pressed, the tape transport direction is reversed, and the Auto space mute time is initialized before restarting.

(8) If the MUTE key is pressed together with the FWD or REV key, the recording mute mode is started in the pressed direction.

13.2.3 Timer Function

1. The CT-3070R (BK) is equipped with two timer functions — timer playback and timer recording. The two timer functions are selected by the TIMER switch.
2. The timer functions are activated 4 seconds after the microcomputer has been reset. Details are described under "Timer sense process" below.
3. Timer sense process
    (1) During interval "a" in Figure 13-2-7 below, the deck first checks that no basic transport key, REC MUTE key, function key, nor auxiliary key has been pressed.
    (2) During interval "b", the deck checks that the FWD and REC keys have been switched to L level together with the TIMER output.
    (3) During interval "c", the "a" interval check is repeated.
    (4) Timer operation is not executed if pressing of a key is detected during the "a" or "c" interval.
    (5) If only the FWD input is L during interval "b", tape transport is put into forward playback mode is in FWD mode, or into reverse playback if in REV mode.
4. Timer recording
    (1) If a key input is detected during the "a" or "c" intervals in Figure 13-2-7, the operation specified by that key is executed instead of the timer operation. If the PAUSE, MS+, or MS- key has been pressed, however, the deck is returned to stop mode.

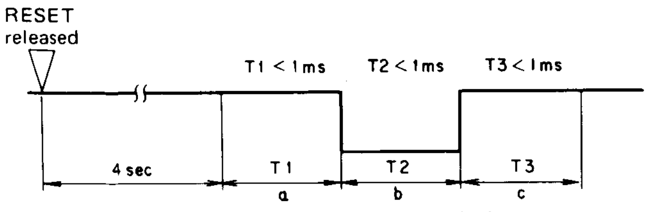


Fig. 13-2-7 Timer sense process timing

1.2.4 MS Function

1. Music search operations are executed by input of MS+ and MS- keys. Cue*1 and review*2 operations differ, however, depending on the tape travel direction when the MS+ or MS- key is pressed.

Key input Tape travel direction	MS+	MS-
FWD (Forward)	CUE	REVIEW
REV (Reverse)	REVIEW	CUE

2. Finding the start of a tune during cue and review modes
    (1) After the start of a tune is detected by the leading edge of the SONG input during forward cue or reverse review mode, the tape continues for another 280ms before being reversed to forward review or reverse cue mode, and then being reversed again to playback mode from the SONG input trailing edge.
    (2) If initially in forward review or reverse cue mode, playback mode is started when the SONG input trailing edge is detected.
3. The MS+ and MS- key inputs can be received for music search operations when the PD3031A is in NON mode*3.

**1 Cue mode: Fast forward mode with head base in music search position.*

**2 Review mode: Rewind mode with head base in music search position.*

**3 NON mode: Refers to the condition where the PD3031A has not been put into any mode at all.*

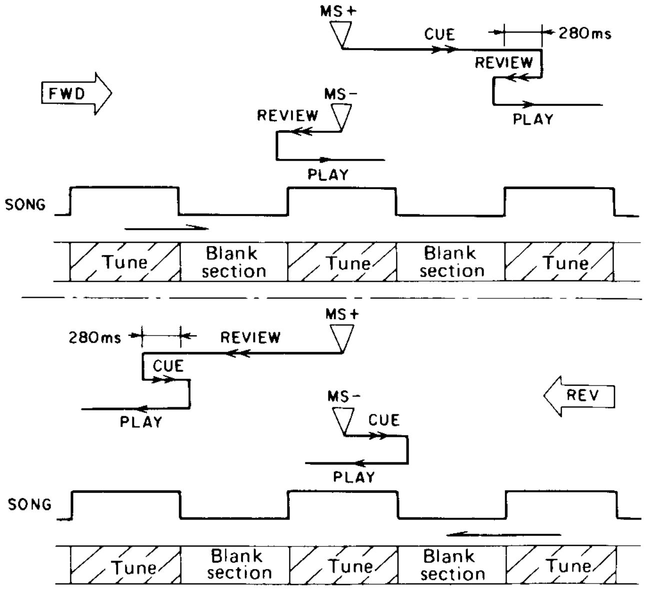


Fig. 13-2-8 MS Operation

4. Skip music search
   (1) By pressing the $\overline{\text{MS+}}$ or $\overline{\text{MS−}}$ key a specific number of times, the music search operation can be skipped up to ten tunes forward or nine tunes back from the tune currently being played. For example, if the $\overline{\text{MS+}}$ key is pressed three times, the tape is advanced by three tunes. The indicator numbers light up in succession each time the key is pressed, and are turned off again in the reverse order each time a blank section of tape between tunes is detected in cue mode. Tape transport is reverted to playback mode from the beginning of the third tune. If the end of the tape is reached during a skip music search operation, the end processing is the same as in cue and review modes.

13.2.5 Skip Function

(1) The $\overline{\text{SKIP}}$ key is a self set/reset type switch where the function is switched on when the key is pressed once, and switched off again when pressed a second time.
(2) The switch is off in the initial reset condition.
(3) The SKIP indicator is on when the skip function is on, and off when the function is off.
(4) If the SONG input remains at L level for at least 8 seconds during playback mode, forward playback is switched to cue mode and reverse playback is switched to review mode. This mode is then returned to playback mode when the beginning of the next tune is located.
(5) If the end of tape is detected during forward cue or reverse review mode, the tape transport direction is reversed when repeat mode has been set, resulting in the tape continuing in review mode in the reverse direction or in cue mode in the forward direction. When the beginning of the next tune is located, the tape is returned to playback mode.
(6) If the deck is switched from playback to palyback pause mode by pressing the $\overline{\text{PAUSE}}$ key while the internal timer is counting 8 seconds with the SONG input at L level, the timer counter is reset. If the PAUSE key is then pressed to return to playback mode, the counting operation is started again.
(7) The music search operation is executed in the same way as when the $\overline{\text{MS+}}$ and $\overline{\text{MS−}}$ keys are used. Detection of the SONG input is enabled 160ms after the reel motors have been started by PLAY, CUE, or REVIEW.
(8) Although the internal timer counts 8 seconds with the SONG input at L level, and cue mode is started in the tape is in the forward direction (or review mode if in the reverse direction), the cue or review mode is continued for another 280ms if the SONG input is at H level when SONG input detection has been enabled 160ms after the reel motor has been switched on. The beginning of the tune is subsequently detected in review mode if tape transport direction is forward, or in cue mode if reverse. This mode is then switched to playback mode from the beginning of the tune.
(9) The $\overline{\text{SKIP}}$ key input cannot be received if the deck is already in program input or playback mode.
(10) The deck is switched to skip function and the SKIP indicator is turned on when the $\overline{\text{SKIP}}$ key input is received.
(11) The skip function is switched off and the SKIP indicator turned off if a $\overline{\text{PROGRAM}}$ signal is received while the skip function is on.

13.2.6 Tape End detector Function

*** Sensing end detector**

The tape end condition is detected and the tape end processing is executed when the sensing input remains at H or L level for at least 3 seconds when tape transport is in playback, recording, recording mute, fast forward, rewind, cue, or review mode.

The tape end process differs according to the selected reverse mode. See Figure 13-2-9. If a $\overline{\text{REC INH}}$ input is applied when the tape direction is reversed during endless recording mode, the tape is stopped after being reversed to the REV direction.

*** Leader tape end detection**

If the LEADER input is switched to H level during playback, recording or recording mute, the end of the leader tape is detected, and the tape transport end processing is executed.

End processing is not executed if the I-LEAD input is switched to H level within 8 seconds after changing to normal speed tape transport. The end processing corresponding to the selected reverse mode is shown in Figure 13-2-10.

* Sensing tape end processing.

Reverse Mode	Current Transport Mode	After Processing
	FF, REW, CUE, REVIEW	STOP
	PLAY, REC	STOP
	Auto space REC MUTE	STOP
	Normal REC MUTE	STOP
	FF, REW	STOP
	FWD-PLAY	REV-PLAY
	REV-PLAY	FWD-PLAY
	FWD-REC	REV-REC
	REV-REC	STOP
	FWD Auto space REC MUTE	REV Auto space REC MUTE
	FWD Normal REC MUTE	REV Normal REC MUTE
	REV Auto space REC MUTE	STOP
	REV Normal REC MUTE	STOP
	FWD-CUE	REV-REVIEW
	REV-REVIEW	FWD-CUE
	FWD-REVIEW, FWD-CUE	STOP

Fig. 13-2-9 Sensing end processing

* Processing by leader tape detector pulse.

Reverse Mode	Current Transport Mode	After Processing
	FF, REW, CUE, REVIEW	No change
	PLAY, REC	No change
	Auto space REC MUTE	No change
	Normal REC MUTE	No change
	FF, REW, CUE, REVIEW	No change
	FWD-PLAY	REV-PLAY
	REV-PLAY	FWD-PLAY
	FWD-REC	REV-REC
	REV-REC	No change
	FWD Auto space REC MUTE	REV Auto space REC MUTE
	FWD Normal REC MUTE	REV Normal REC MUTE
	REV Auto space REC MUTE	No change
	REV Normal REC MUTE	No change

Fig. 13-2-10 Leader tape end processing

13.2.7 Remote Control Signal Processing Function (CT-3070R [BK]/D/G only)

When the prescribed serial signal is applied to the $\overline{\text{REMOTE}}$ terminal, the tape transport mechanisms and indicator signal systems are controlled in the same way as with front panel key inputs.

(1) Input conditions (assuming that the carrier has been removed from the input signal)

a. The signal format conforms with the format set for μPD6102G. (See Figure 13-2-12.)

b. Only when the specified custom code (component code) is applied to the $\overline{\text{REMOTE}}$ terminal can the tape transport mechanisms and signal systems be controlled by the following data code (instruction code).

c. If a remote control input signal is applied during an assisted tape transport operation (that is, while the tape transport mode is being switched), that signal is neither received nor processed until the assisted operation has been completed.

d. During the remote control signal leader code, a check is made for a $\overline{\text{STOP}}$ key input, and if the input is ON (L), the remote control signal is disregarded.

(2) Input processing (±20% deviation permitted in all timing

a. The input signal trailing edge is detected at the REMOTE terminal.

b. The validity of the leader code is determined by the duration (approx. 12.3ms) of that code after the code "L" level has been detected.

Unit pulse width T3 : 0.5096ms
(Reception range 0.020ms < T3 < 0.9ms)

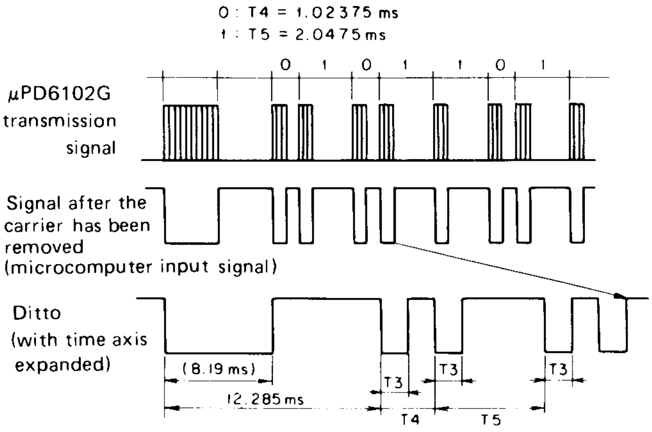

0 : T4 = 1.02375 ms
1 : T5 = 2.0475ms
0 1 0 1 1 0 1
μPD6102G transmission signal
Signal after the carrier has been removed (microcomputer input signal)
Ditto (with time axis expanded)
(8.19 ms)
12.285ms
T3
T3
T3
T4
T5

Fig. 13-2-11 Remote control input signal

c. Custom code and data code "1" and "0" logic decisions are based on data pulse intervals (approx. 1.02ms for 0, and approx. 2.05ms for 1).

(3) Control processing

a. When the remote control signal is valid, 25 different control modes can be used.

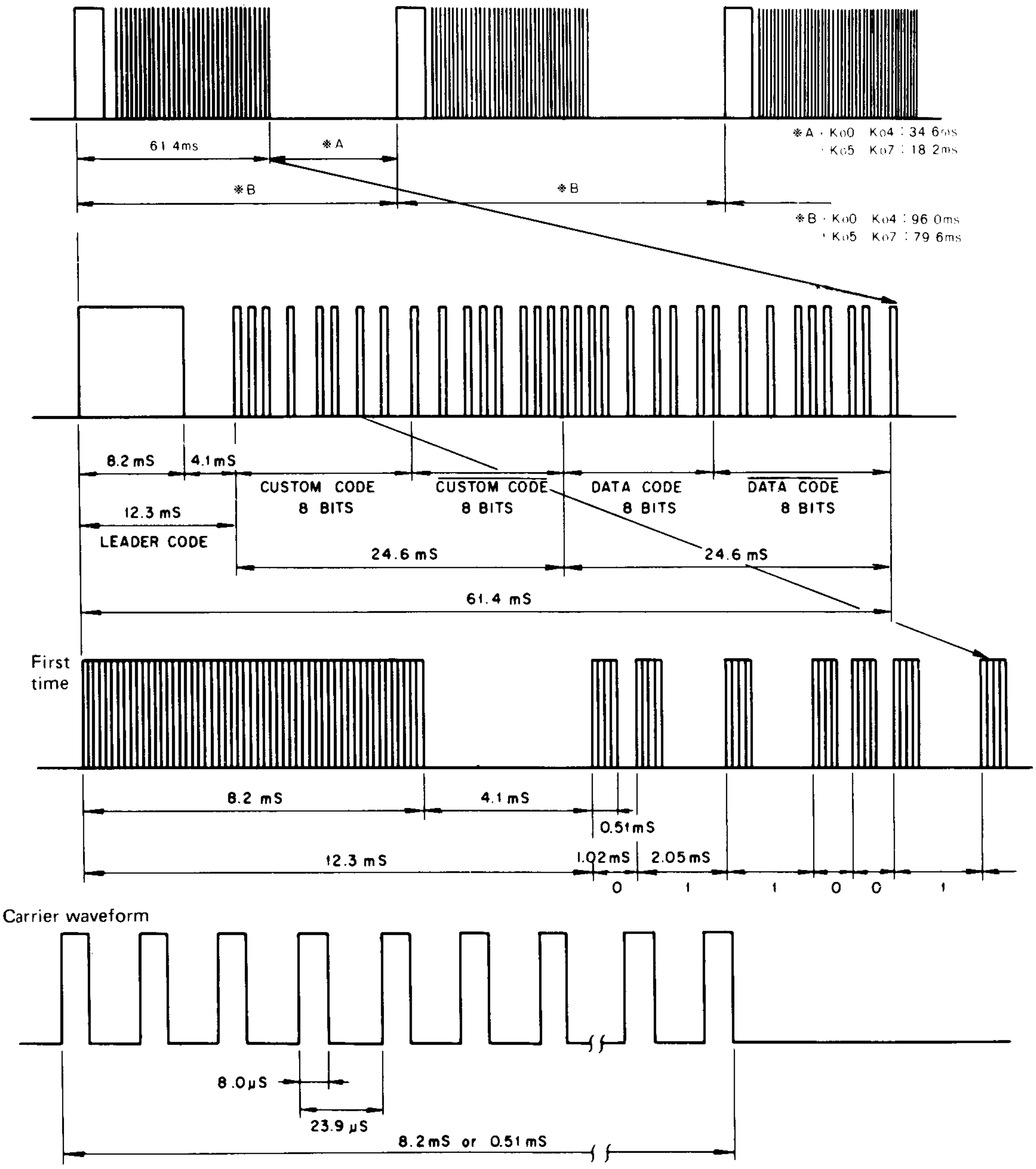
b. Control modes are executed in the same way as with the corresponding key input.

c. At the same time that a control mode is executed, the presence of a signal on the DATA IN terminal is also checked. If a signal break (of at least 300ms) is detected, the system is switched to input standby to wait for another remote control signal.

d. If the data in the first remote control signal is invalid, the data in the second input is monitored, and subsequently executed if valid.

e. If the data in the second signal is also invalid, the data in the third signal is monitored. This procedure is repeated.

Times for a 500kHz oscillator


61 4ms
*A
*B
*B
*A · Ko0 Ko4 : 34 6ms
· Ko5 Ko7 : 18 2ms
*B · Ko0 Ko4 : 96 0ms
· Ko5 Ko7 : 79 6ms
8.2 mS
4.1 mS
CUSTOM CODE
8 BITS
CUSTOM CODE
8 BITS
DATA CODE
8 BITS
DATA CODE
8 BITS
12.3 mS
LEADER CODE
24.6 mS
24.6 mS
61.4 mS
First time
8.2 mS
4.1 mS
0.51mS
12.3 mS
1.02mS
2.05mS
0
1
1
0
0
1
Carrier waveform
8.0μS
23.9 μS
8.2mS or 0.51 mS

Carrier frequency............... fc=f osc/12=42kHz

Fig. 13-2-12 Remote control signal format

* Program check function

If the RUN (START) key is pressed during program input mode, the tape is changed to rewind mode if in forward direction, or to fast forward mode if in reverse direction due to execution of current tune number designation. If a key input is applied, the tune number indicators on the forward side blink on off in the selected sequence, and then the indicators on the reverse side blink on and off. At the same time, the FWD and REV indicators indicate by blinking the side where the input program is located. The music search operations stops until this tune number indicator scanning has been completed.

13.2.9 Function Modes

Pressing the individual function keys after the decks have been reset results in the corresponding functions being set. These modes are summarized below.

(1) NON mode —— (2) Program input mode
(3) Program playback mode
(1) NON mode . . . Status where no mode has been set.
(2) Program input mode
. . . . . . Mode where basic transport mode keys are changed to numerical keys to anable program input.
(3) Program playback mode
. . . . . . Mode where program playback is executed.

13.2.10 Mode Changes Diagram

See Figure 13-2-13.

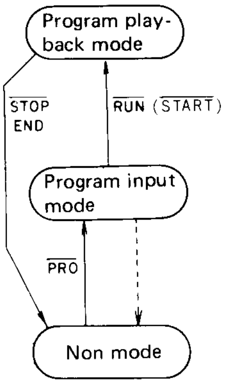


Fig. 13-2-13 Mode change diagram

13.2.11 Function Key Input Acceptance Conditions

When a function key input is received, the corresponding function mode is started. Since there is basically no shift between function modes, function key inputs cannot be received once a function mode has been started. Function changes must usually be made by first switching to the NON mode. Function key inputs cannot be accepted while a motor assist operation is being executed in the deck.

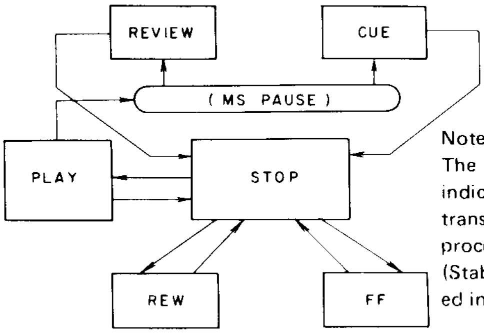
13.2.12 Conditions for Accepting Function Key Inputs in NON Mode

The PROGRAM input can only be received when the deck is in stop mode, and the basic transport mode keys are changed to numerical keys 1 thru 10.

13.2.13 Changes in Basic Tape Transport Modes

The tape transport modes shown in the tape transport assist timing chart are represented by the basic tape transport assist modes shown in Figure 13-2-14.

	Basic tape transport assist mode	Tape transport mode
FWD or REV	STOP	STOP, STOP/PAUSE, PLAY/PAUSE, REC/PAUSE
	FF	FF
	REW	REW
	PLAY	PLAY, REC
	CUE	CUE
	REVIEW	REVIEW



Note:
The MS pause mode is indicated as a tape transport assist check process.
(Stability is not achieved in this mode.)

Fig. 13-2-14 Basic tape transport mode changes

13.2.14 Motor Control Outputs

There are four control signals used in tape transport control in the deck. These are the AFWD and AREV outputs used in assist operations, and the RML and RMR reel motor drive signals.

		AFWD	
		H	L
AREV	H	STOP	REV
	L	FWD	STOP

		RML	
		H	L
RMR	H	STOP	FF
	L	REW	STOP

The drive direction of the control motors is determined by H and L combinations as shown in the above table. And during normal speed tape transport modes (forward playback, reverse playback, recording, and recording mute) the PLAY OUT output is synchronized with the reel motor output.

13.2.15 Amplifier Control Outputs

The ports listed in Figure 13-2-15 are used as amplifier control outputs, and the amplifier control outputs in each mode are listed in Figure 13-2-16.

Port Name	Active	Description
$\overline{\text{BIAS}}$	L	BIAS OSC control, ON: L
$\overline{\text{I-REC SW}}$	L	REC switching signal
$\overline{\text{I-REC MUTE}}$	L	Recording mute mode: L
$\overline{\text{LINE MUTE}}$	L	Line mute control

Fig. 13-2-15 Amplifier system control outputs

Control Output / Tape Transport Modes	$\overline{\text{I-REC SW}}$	$\overline{\text{BIAS}}$	$\overline{\text{LINE MUTE}}$	$\overline{\text{I-REC MUTE}}$
STOP, FF, REW	H	H	L	L
STOP/PAUSE, CUE, REVIEW, PLAY/PAUSE	H	H	L	L
PLAY	H	H	H	L
REC	L	L	H	H
REC/PAUSE, REC MUTE	L	L	H	L

Fig. 13-2-16 Tape transport modes and corresponding control outputs

13.2.16 Indicator Outputs

The indicator outputs include DISP 1 thru 6, and the RUN (PROGRAM PLAY) indicators. Since DISP 1 thru 6 form a matrix with SEL A thru D, 24 different indicator outputs are possible. The indicator output matrix is shown in Figure 13-2-17.

(Respective indicators are turned on when SEL and DISP are both at "H" level.)

13.2.17 Initialized State When Power Is Switched On

The deck is put into stop mode for 4 seconds following release of RESET after the power is switched on. During this period, no key inputs are accepted at all. The control keys are set to the basic transport mode in NON mode where no other function key as been pressed.

Following the RESET release, FWD is in forward stop mode and REV is in reverse stop mode, irrespective of the encoder position at the RESET.

13.2.18 Processing When Power Is Switched Off

When a leading edge pulse signal is applied to the POWER OFF PULSE pin, tape transport is put into stop mode, and all key inputs are inhibited for 3 seconds. No matter what the tape transport mode may be, and "L" output is passed to $\overline{\text{LINE MUTE}}$ and $\overline{\text{I–REC MUTE}}$ as soon as the leading edge pulse input is applied to the POWER OFF PULSE pin. And at the same time that the indicator outputs are turned off, $\overline{\text{BIAS}}$ is set to H level, and the tape transport mechanism is put into stop mode.

The POWER OFF processing function has priority over the remote control signal processing function.

	SEL A	SEL B	SEL C	SEL D
DISP 1	▷		2	4
DISP 2	◁		9	5
DISP 3	PLAY		10	6
DISP 4	REC			7
DISP 5			SKIP	8
DISP 6	DATA IN		1	3

Fig. 13-2-17 Indicator output matrix

13.2.8 Program Functions

Program functions can be divided into the following two modes.

(1) Program input mode ———— (2) Program playback mode

(1) Program input mode

(1) Program input mode cannot be started unless the deck is in stop mode.

(2) Once the PROGRAM input has been received, the basic transport mode keys and the REC MUTE key become numerical keys 1 thru 10.

(3) The PROGRAM indicator lights up during program input mode.

(4) In the initialized state, the input program is recorded on side A (FWD). The input side can be switched by the A/B SEL key.

(5) To indicate the specified input side, the FWD (▷) indicator blinks on and off when side A has been specified, and the REV (◁) indicator blinks on and off when Side B has been specified. At the same time, indicators 1 thru 10 also blink on and off to indicate that input is possible.

(6) The maximum number of into tunes is ten in 10 steps per side.

(7) The keys 1 thru 10 indicate the tune number from the first tune on each side.

(8) If side B input is selected by the A/B SEL key while in side A input mode, the A/B SEL key cannot be used a second time, and no further input is possible on side A.

(9) No more than ten tunes can be accepted on each side. And after ten tunes have been accepted on side A, the next input tune is automatically accepted on side B.

(10) All indicators 1 thru 10 start to blink on and off when program input mode is activated. The blinking stops after the first tune is received, and the tune number is indicated instead.

(11) The memory sequence is the same as the input sequence.

For example, input in the following sequence

A—3, 5, 7,　　B—2, 4, 8

results in

STEP 1	A—3
2	A—5
3	A—7
4	B—2
5	B—4
6	B—8

The program starts from A—3.

(12) Input of the same tune more than once is possible. The same tune can be accepted up to ten times per side.

(13) The RUN (PROGRAM PLAY) indicator blinks on and off even if only a single tune is programmed.

(14) The numerical indicator corresponding to the input tune number lights up. When the A/B SEL key (SIDE B) is used to switch from side A to side B input mode, the side A tune number indicators go off, and the side B tune number indicators light up instead.

(15) If the same tune is programmed more than once, the tune number indicator is the same as the first time it was programmed.

(16) Although RESET key input from program input mode is possible, thereby returning to the deck transport key mode in NON mode, the program data is cleared, and the tune number and input side indicators are turned off. The tape travel direction indicators stop blinking and indicate the current direction instead, and the RUN (PROGRAM PLAY) and DATA IN indicators are turned off.

(17) The memory is also cleared if the program key is pressed a second time after program input mode has been started. The indicators 1 thru 10 commence to blink on and off again to indicate a return to the initial input status.

(18) Once the program has been received, the indicators blink on and off momentarily to indicate that keys 1 thru 10 have been received.

(2) Program playback mode

Program playback mode is activated by pressing the RUN key (START) when the RUN (PROGRAM PLAY) indicator blinks on and off during program input mode.

* Current tune addressing

When program playback mode is started, the tape is rewound in forward mode and the current tune address is set by tape end. And if there is no input on side A (FWD side), the tape is started in reverse mode and is put into fast forward mode.

* Tune selection

In a program consisting, for example, of A—3 and A—5, the A—3 tune is selected and played first. If that tune is followed by a blank section of tape at least 2.5 seconds in duration, playback mode is reverted to music search mode to select A—5. And if B—2 has been programmed after A—3 and A—5, the tape travel direction is reversed after playback of A—5 has been completed. Then following side B current tune designation, the B—2 tune is selected and played.

* Indicators and memory

When, for example, A—3, A—5, and B—2 are selected as in the previous example, the selection is commenced from side A, which means that the 3 and 5 indicators for side A will be on. Selection of A—3 is commenced after the current tune designation, then following completion of a program check, the 3 indicator starts to blink on and off. Playback of A—3 is followed by selection of A—5, and at this tims the A—3 data is cleared, the 3 indicator is turned off, and the 5 indicator starts to blink on and off. Likewise, after playback of A—5 has been completed, the A—5 data is cleared. And after side A has been completed, the tape travel direction is reversed, and the side B tunes are indicated. After completing the final side A step, the side B current tune designation operation is executed, followed by selection of B—2 and blinking of the 2 indicator. After B—2 has been played, the B—2 data is cleared and the 2 indicator is turned off. If no more programs have been programmed, the operation is stopped and the system is returned to NON mode with the multi-mode keys set to the basic transport mode.

In programs where the same tune has been set for multiple selection (for example, step (1) A—2, (2) A—5, (3) A—2, (4) A—2 with A—2 being selected three times) the step (1) A—2 data is cleared, but the 2 indicator is not turned off.

* Key inputs during program execution

The only keys which can be used during programmed playback are STOP, MS+, and MS−.

STOP .... Program playback is stopped, data is cleared, and the system is returned to NON mode with multi-mode keys set to the basic transport mode.

MS+ ..... Can only be used during actual playback in program playback mode (although the input is not accepted during the first 8 seconds of playback). This input results in selection of the tune in the next step of the program. The data of the step being played is cleared, the indicator is turned off, and the indicator for next tune starts to blink on and off.

MS− ..... This, too, can only be used during actual playback in program playback mode (although the input is not accepted during the first 8 seconds of playback). The tune currently being played is selected a second time, and the indicator continues to blink on and off without the data being cleared.

If an MS+ input is applied when at the last step of the program, the program playback mode is cancelled and tape transport is stopped.

* Leader end processing during the program

During program playback mode, if the I-LEAD input is switched to H level, LEADER input cannot be used irrespective reverse made setting.

* Sensing end processing during the program

If there is no sensing pulse input for at least 3 seconds when in cue mode during a music search operation, that is, when the end of the tape has been reached, not only is the auto stop mechanism activated, but the program playback mode is cancelled, all tune number data from the currently selected tune is cleared, and the tune number indicators are turned off. End processing from forward review or reverse cue mode results in the current position being reset, and the music search operation being continued.

* Program playback and reverse mode designation

During program input and program playback modes, music search and input operations in the deck can be transferred from side A to side B irrespective of reverse mode settings.

13.2.19 Processing When An Assist Error Is Generated

If the prescribed mode is not achieved within 4 seconds after the tape transport assist operation is commenced, the deck is returned to stop mode. And if stop mode is not achieved within 4 seconds after that, all outputs are turned off in the same sequence and timing as when a STOP input is applied.

13.2.20 Prevention of Encoder Chattering

To prevent encoder chattering, encoder inputs are checked a second time after the tape transport assist operation has been completed.

13.2.21 Definition of End of Assist Operation

Completion of tape transport assist operation is defined as the start timing of the final electromagnetic brake in the assit motor.

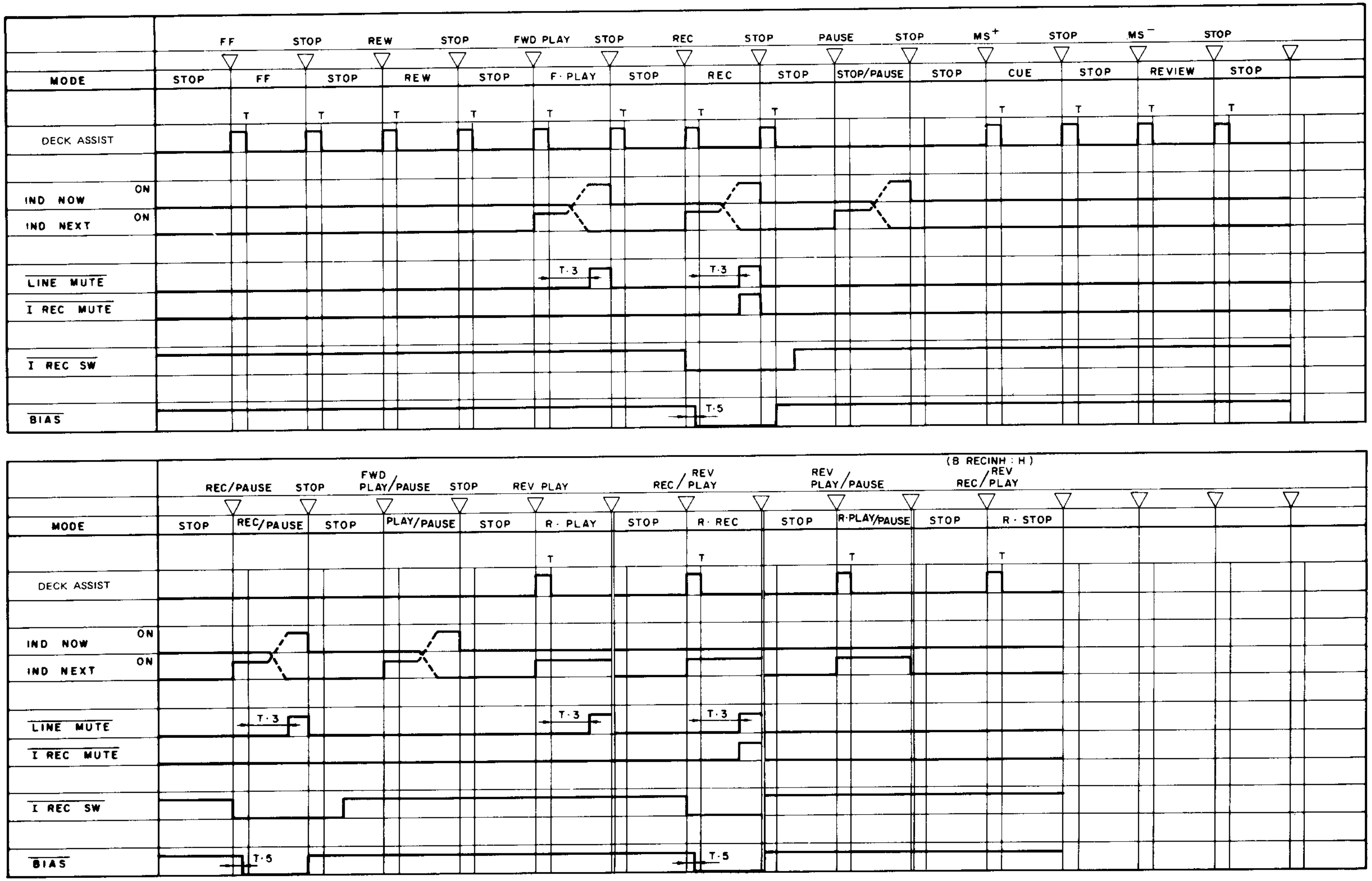
13.2.22 Timing During Function Modes

(1) The timing for switching the bias off in recording mode follows completion of the assist operations in the deck.
(2) If assist operations are executed in the deck, the timing setting of mute signal and amplifier switching SW follows completion of the assist operations in the deck.
(3) The initialized timing for Auto space mute in recording mode also follows completion of the assist operations in the deck.

13.2.23 REC Key and End Processing

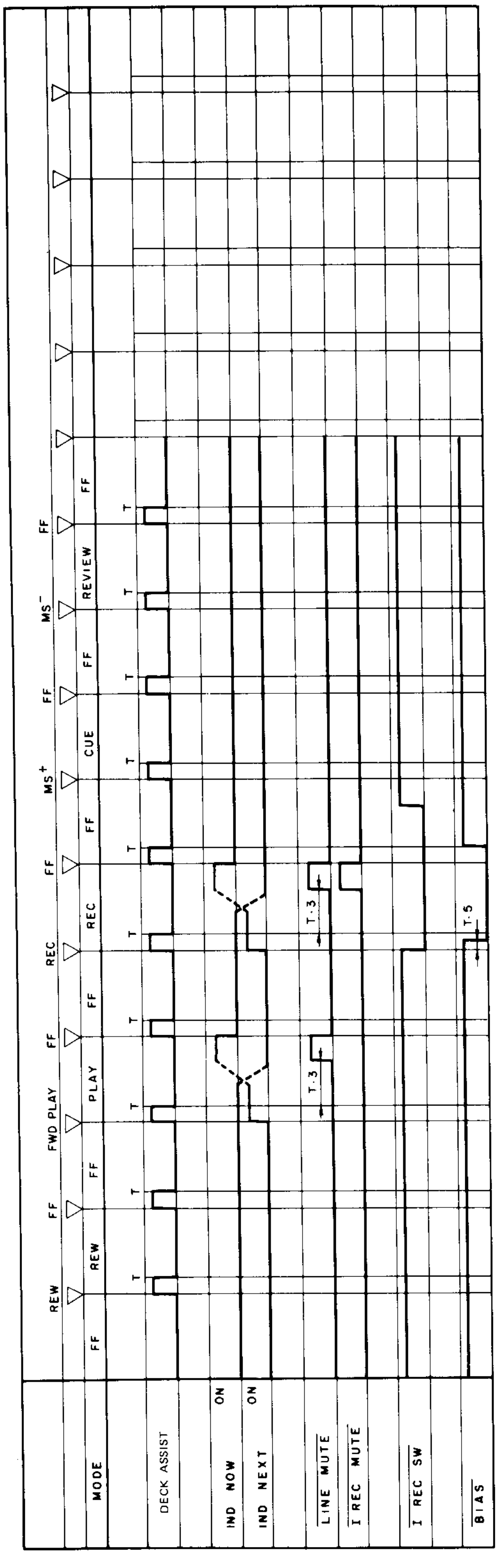
Even in endless mode, tape direction cannot be reversed during the end processing by keeping the $\overline{\text{REC}}$ key depressed in forward recording mode.

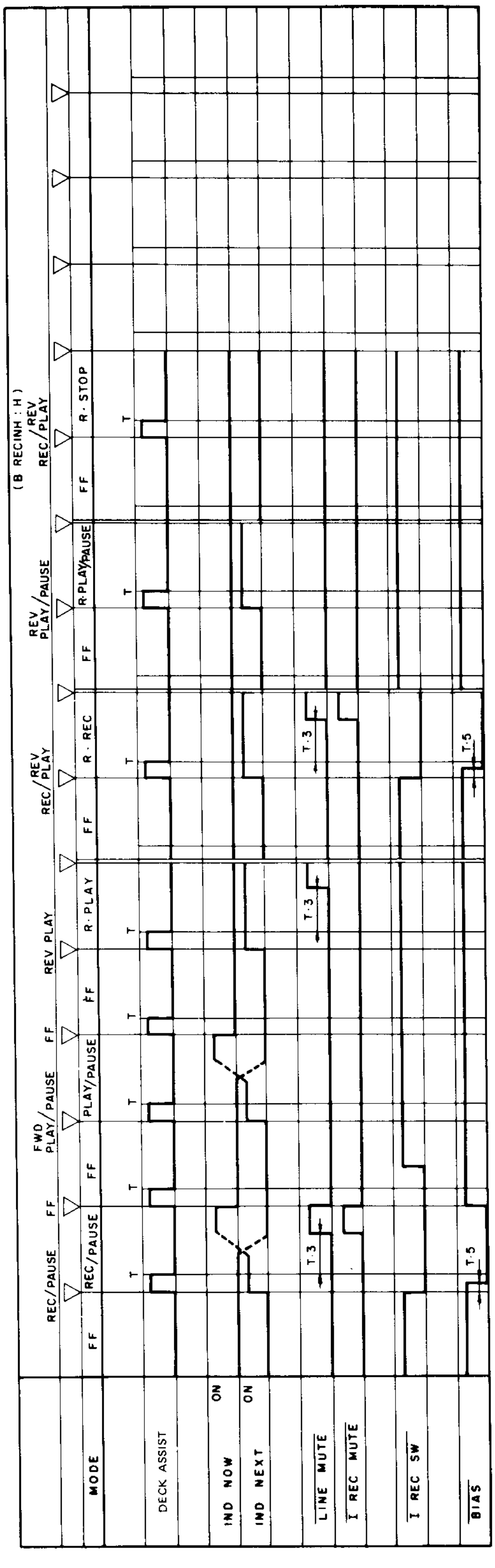
13.3 PD3031A CONTROL TIMING CHARTS


FF
STOP
REW
STOP
FWD PLAY
STOP
REC
STOP
PAUSE
STOP
MS+
STOP
MS−
STOP
MODE
STOP
FF
STOP
REW
STOP
F·PLAY
STOP
REC
STOP
STOP/PAUSE
STOP
CUE
STOP
REVIEW
STOP
DECK ASSIST
T
IND NOW
ON
IND NEXT
ON
LINE MUTE
T·3
I REC MUTE
I REC SW
BIAS
T·5
REC/PAUSE
STOP
FWD PLAY/PAUSE
STOP
REV PLAY
REC/REV PLAY
REV PLAY/PAUSE
(B RECINH : H)
REC/REV PLAY
MODE
STOP
REC/PAUSE
STOP
PLAY/PAUSE
STOP
R·PLAY
STOP
R·REC
STOP
R·PLAY/PAUSE
STOP
R·STOP
DECK ASSIST
T
IND NOW
ON
IND NEXT
ON
LINE MUTE
T·3
I REC MUTE
I REC SW
BIAS
T·5

TIMING (mS)

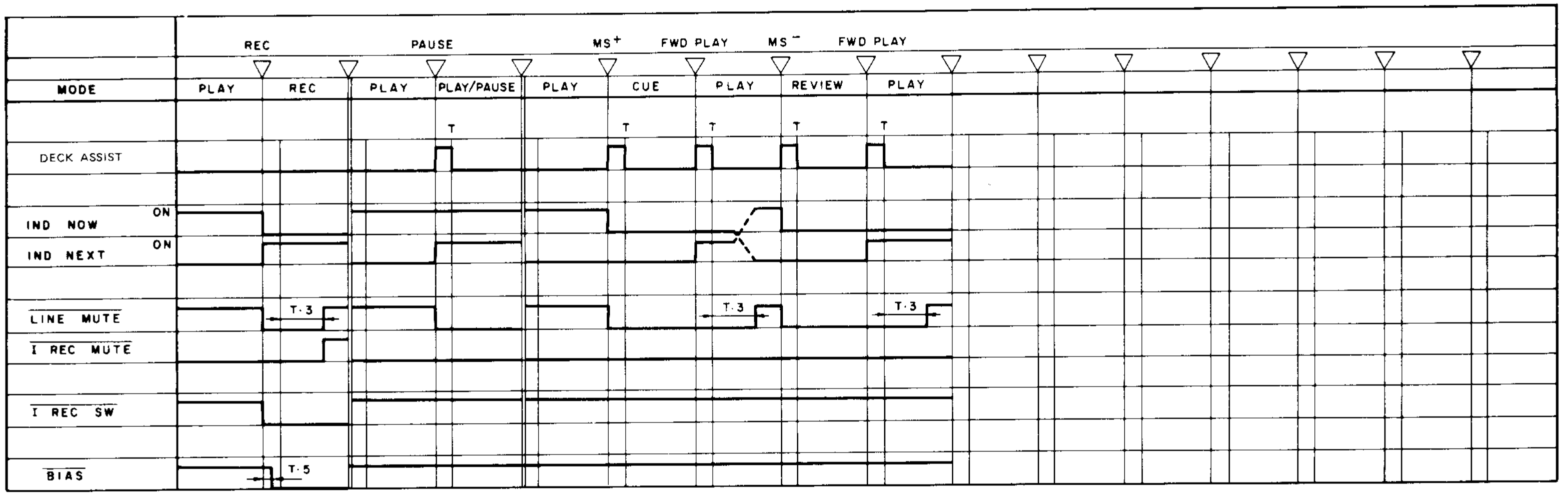
T·1		T·5	40	T·9		T·13	
T·2		T·6		T·10		T·14	
T·3	250	T·7		T·11			
T·4		T·8		T·12			

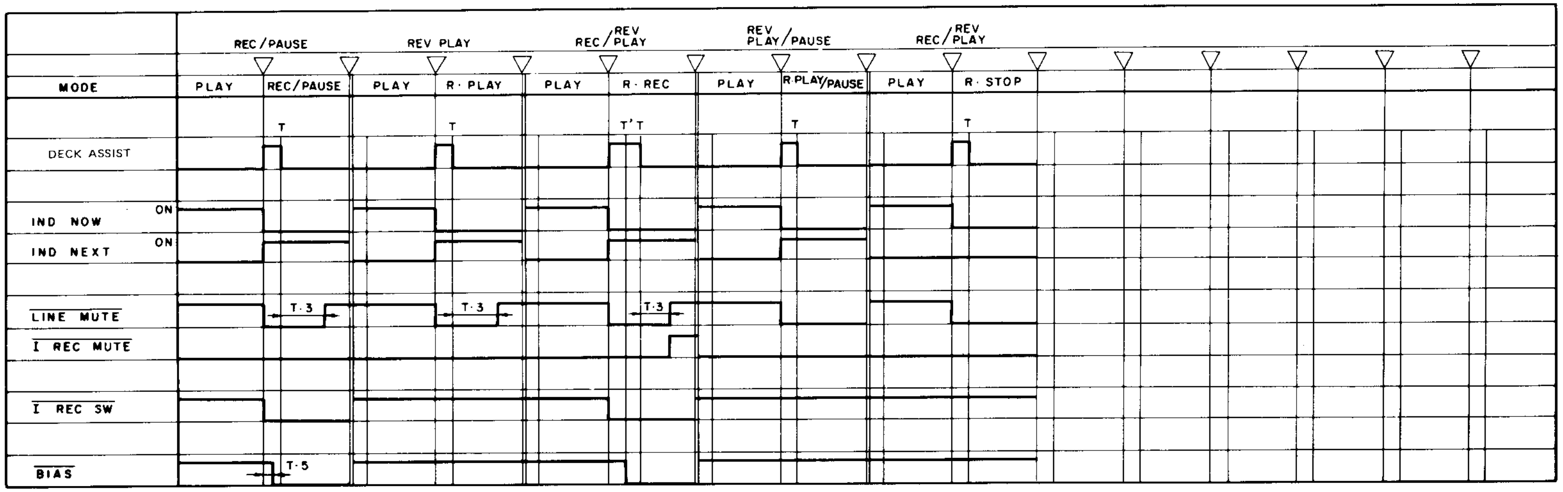

MODE
DECK ASSIST
IND NOW
ON
IND NEXT
ON
LINE MUTE
I REC MUTE
I REC SW
BIAS
FF
REW
FF
FWD PLAY
PLAY
FF
REC
FF
MS+
CUE
FF
MS−
REVIEW
FF
T
T·3
T·5


MODE
DECK ASSIST
IND NOW
ON
IND NEXT
ON
LINE MUTE
I REC MUTE
I REC SW
BIAS
FF
REC/PAUSE
FF
FWD PLAY/PAUSE
PLAY/PAUSE
FF
REV PLAY
R·PLAY
FF
REC/REV PLAY
R·REC
FF
REV PLAY/PAUSE
R·PLAY/PAUSE
FF
(B RECINH : H)
REC/REV PLAY
R·STOP
T
T·3
T·5

TIMING (mS)

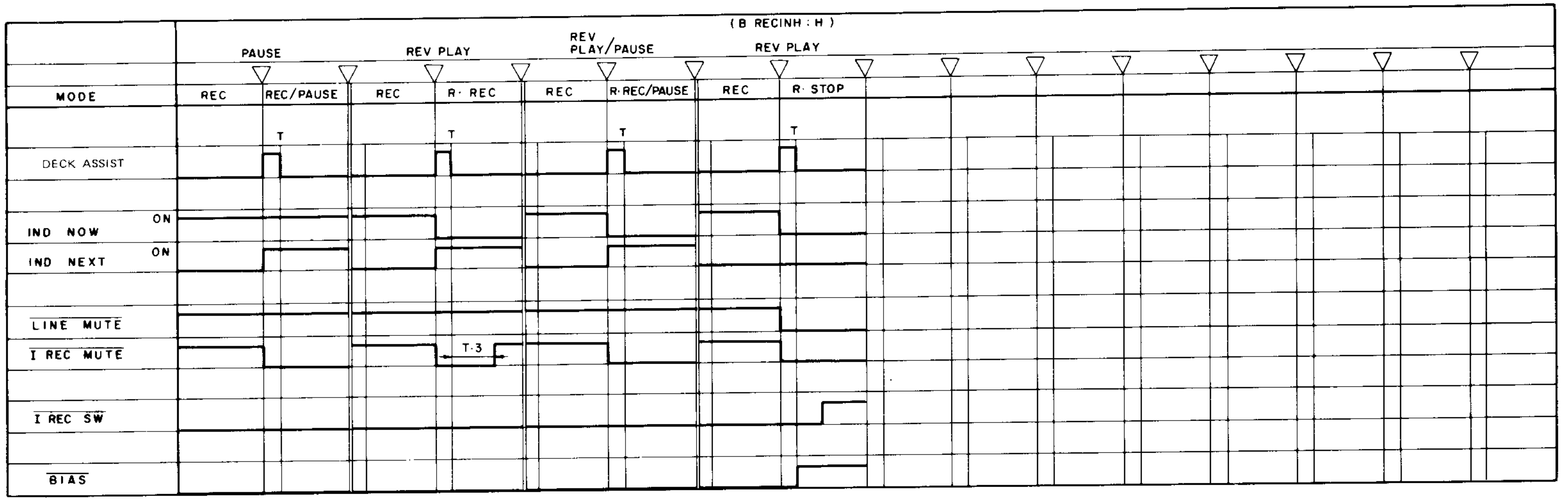
T·1		T·5	40	T·9		T·13	
T·2		T·6		T·10		T·14	
T·3	250	T·7		T·11			
T·4		T·8		T·12			


REC
PAUSE
MS+
FWD PLAY
MS−
FWD PLAY
MODE
PLAY
REC
PLAY
PLAY/PAUSE
PLAY
CUE
PLAY
REVIEW
PLAY
T
DECK ASSIST
IND NOW
ON
IND NEXT
ON
T·3
LINE MUTE
I REC MUTE
I REC SW
T·5
BIAS


REC/PAUSE
REV PLAY
REC/REV PLAY
REV PLAY/PAUSE
REC/REV PLAY
MODE
PLAY
REC/PAUSE
PLAY
R·PLAY
PLAY
R·REC
PLAY
R PLAY/PAUSE
PLAY
R·STOP
T
T'T
DECK ASSIST
IND NOW
ON
IND NEXT
ON
T·3
LINE MUTE
I REC MUTE
I REC SW
T·5
BIAS

TIMING (mS)

T·1		T·5	40	T·9		T·13	
T·2		T·6		T·10		T·14	
T·3	250	T·7		T·11			
T·4		T·8		T·12			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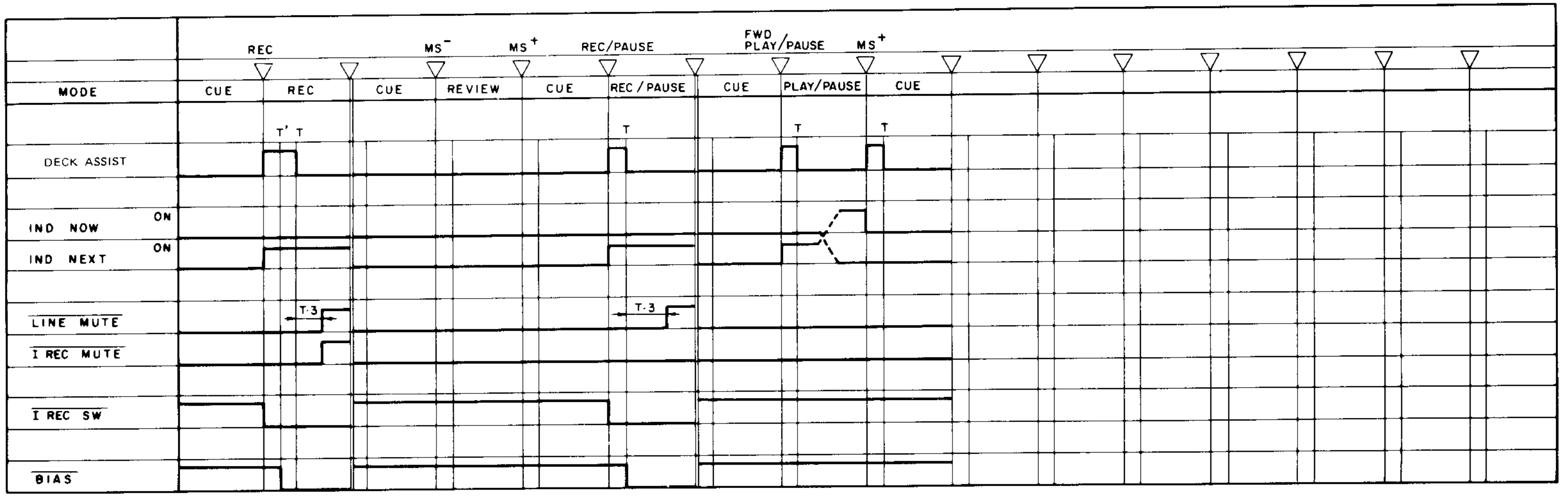
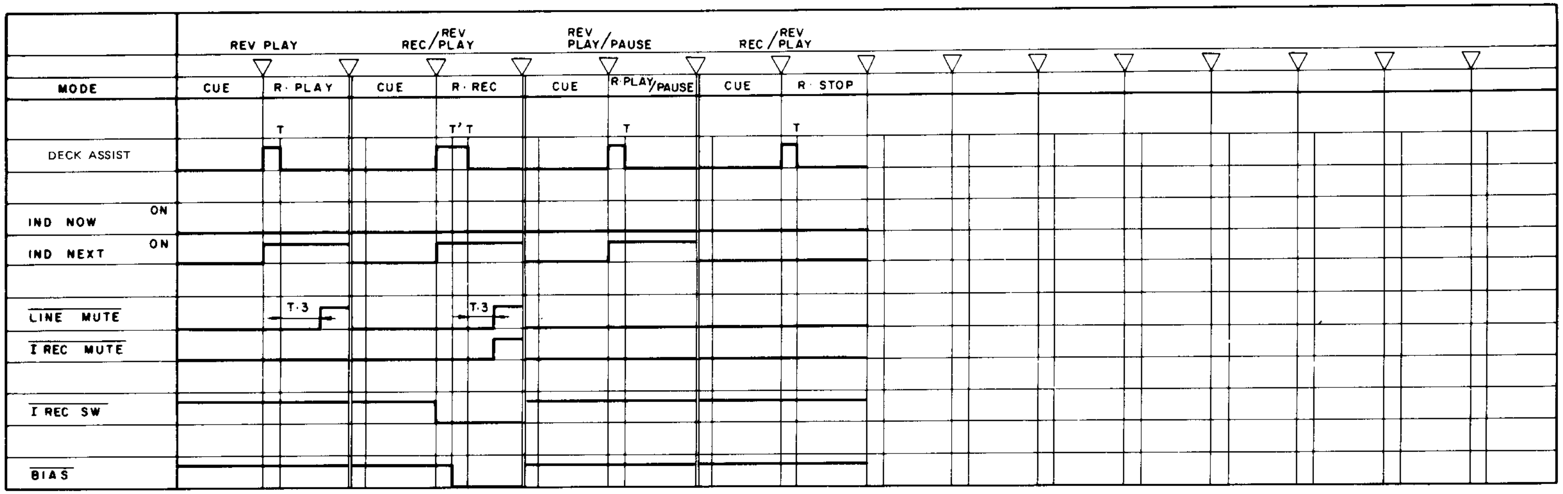
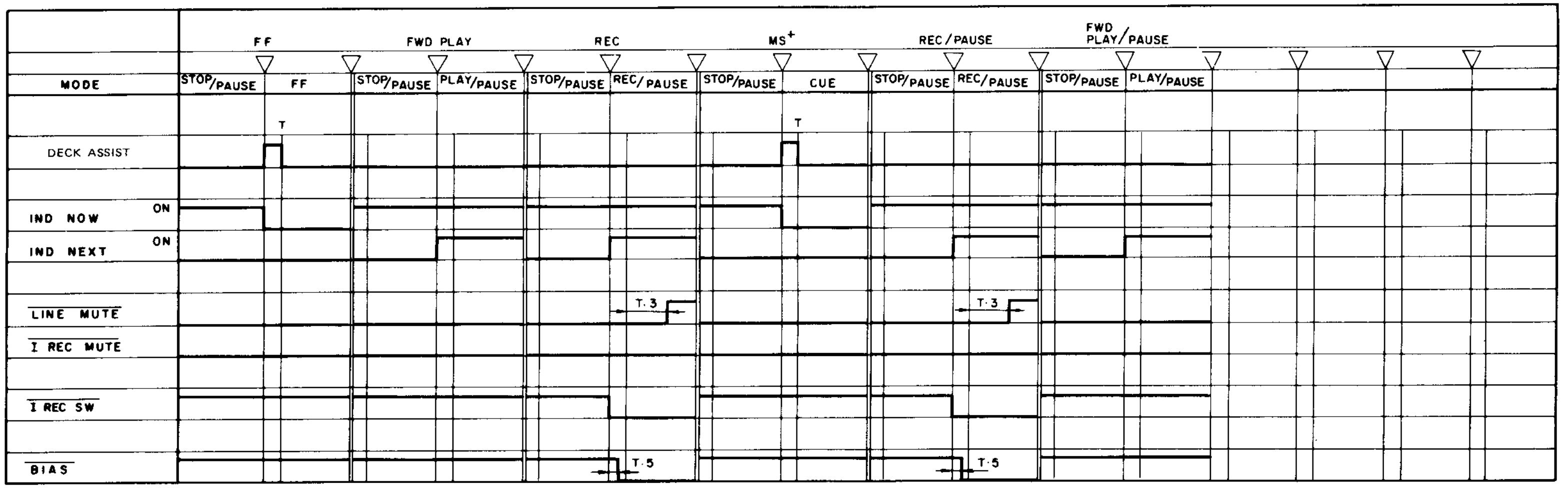
PAUSE
REV PLAY
REV PLAY/PAUSE
REV PLAY
MODE
REC
REC/PAUSE
REC
R· REC
REC
R·REC/PAUSE
REC
R· STOP
T
DECK ASSIST
IND NOW
ON
IND NEXT
ON
LINE MUTE
I REC MUTE
T·3
I REC SW
BIAS


REC
MS⁻
MS⁺
REC/PAUSE
FWD PLAY/PAUSE
MS⁺
MODE
CUE
REC
CUE
REVIEW
CUE
REC / PAUSE
CUE
PLAY/PAUSE
CUE
T' T
T
DECK ASSIST
IND NOW
ON
IND NEXT
ON
T·3
LINE MUTE
I REC MUTE
I REC SW
BIAS

TIMING (mS)

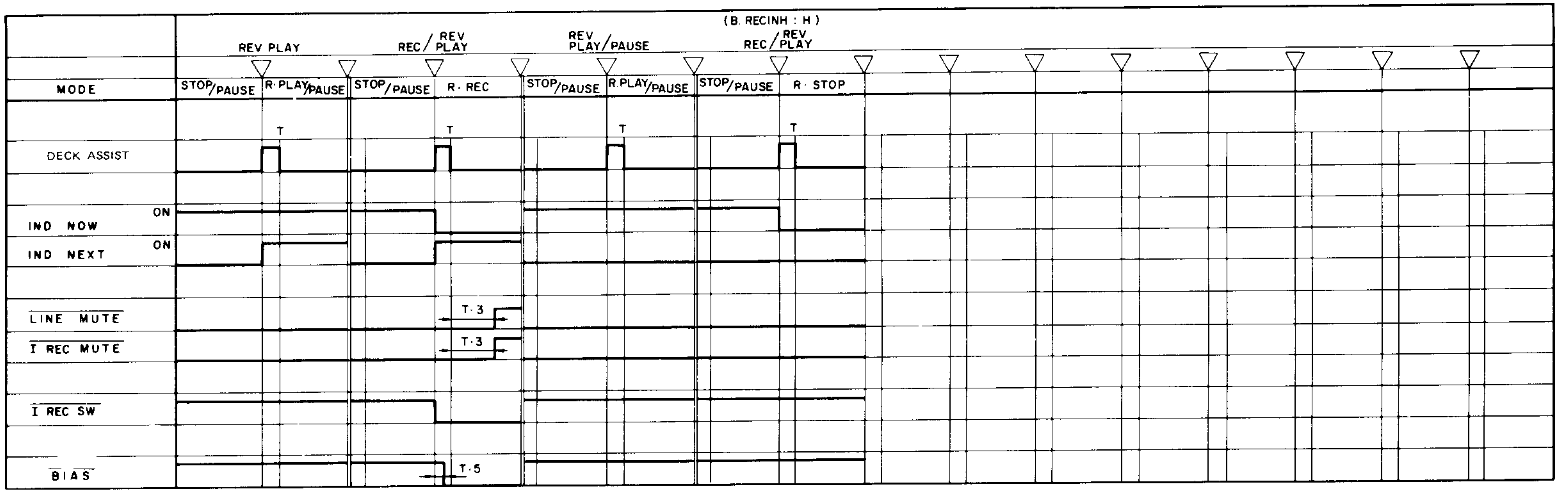
T·1		T·5		T·9		T·13	
T·2		T·6		T·10		T·14	
T·3	250	T·7		T·11			
T·4		T·8		T·12			

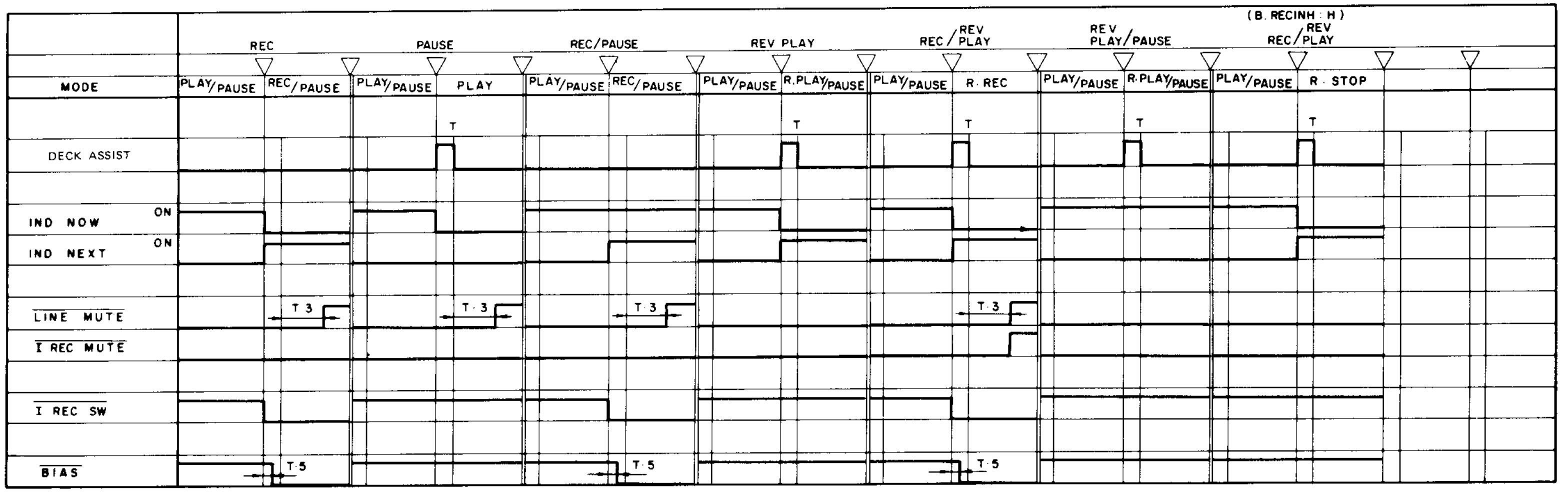

REV PLAY
REC/REV PLAY
REV PLAY/PAUSE
REC/REV PLAY
MODE
CUE
R·PLAY
CUE
R·REC
CUE
R·PLAY/PAUSE
CUE
R·STOP
T
T' T
DECK ASSIST
IND NOW
ON
IND NEXT
ON
T·3
LINE MUTE
I REC MUTE
I REC SW
BIAS


FF
FWD PLAY
REC
MS+
REC/PAUSE
FWD PLAY/PAUSE
MODE
STOP/PAUSE
FF
STOP/PAUSE
PLAY/PAUSE
STOP/PAUSE
REC/PAUSE
STOP/PAUSE
CUE
STOP/PAUSE
REC/PAUSE
STOP/PAUSE
PLAY/PAUSE
T
DECK ASSIST
IND NOW
ON
IND NEXT
ON
T·3
LINE MUTE
I REC MUTE
I REC SW
BIAS
T·5

TIMING (mS)

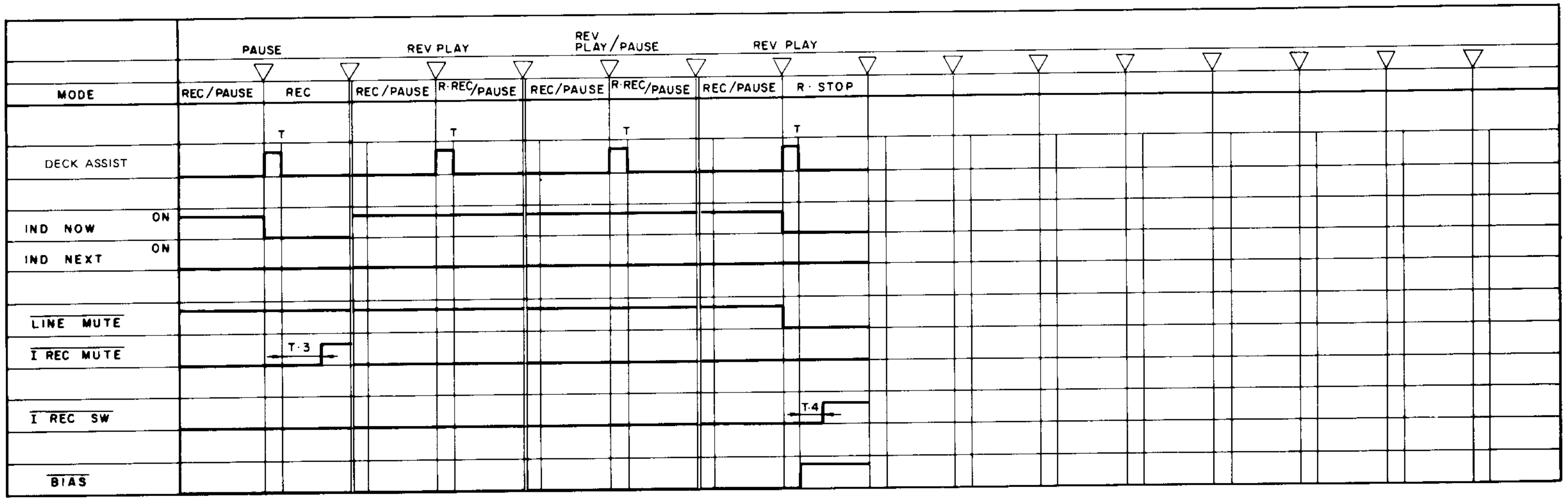
T·1		T·5	40	T·9		T·13	
T·2		T·6		T·10		T·14	
T·3	250	T·7		T·11			
T·4		T·8		T·12			


MODE
DECK ASSIST
IND NOW
IND NEXT
LINE MUTE
I REC MUTE
I REC SW
BIAS
ON
ON
REV PLAY
REC/REV PLAY
REV PLAY/PAUSE
(B. RECINH : H)
REC/REV PLAY
STOP/PAUSE
R·PLAY/PAUSE
STOP/PAUSE
R·REC
STOP/PAUSE
R PLAY/PAUSE
STOP/PAUSE
R·STOP
T
T
T
T
T·3
T·3
T·5


MODE
DECK ASSIST
IND NOW
IND NEXT
LINE MUTE
I REC MUTE
I REC SW
BIAS
ON
ON
REC
PAUSE
REC/PAUSE
REV PLAY
REC/REV PLAY
REV PLAY/PAUSE
(B. RECINH : H)
REC/REV PLAY
PLAY/PAUSE
REC/PAUSE
PLAY/PAUSE
PLAY
PLAY/PAUSE
REC/PAUSE
PLAY/PAUSE
R.PLAY/PAUSE
PLAY/PAUSE
R·REC
PLAY/PAUSE
R·PLAY/PAUSE
PLAY/PAUSE
R·STOP
T
T
T
T
T
T·3
T·3
T·3
T·3
T·5
T·5
T·5

TIMING (mS)

T·1		T·5	40	T·9		T·13	
T·2		T·6		T·10		T·14	
T·3	250	T·7		T·11			
T·4		T·8		T·12			


PAUSE
REV PLAY
REV PLAY/PAUSE
REV PLAY
MODE
REC/PAUSE
REC
REC/PAUSE
R·REC/PAUSE
REC/PAUSE
R·REC/PAUSE
REC/PAUSE
R·STOP
T
DECK ASSIST
IND NOW
ON
IND NEXT
ON
LINE MUTE
I REC MUTE
T·3
I REC SW
T·4
BIAS

TIMING (mS)

T·1		T·5		T·9		T·13	
T·2		T·6		T·10		T·14	
T·3	250	T·7		T·11			
T·4	60	T·8		T·12			